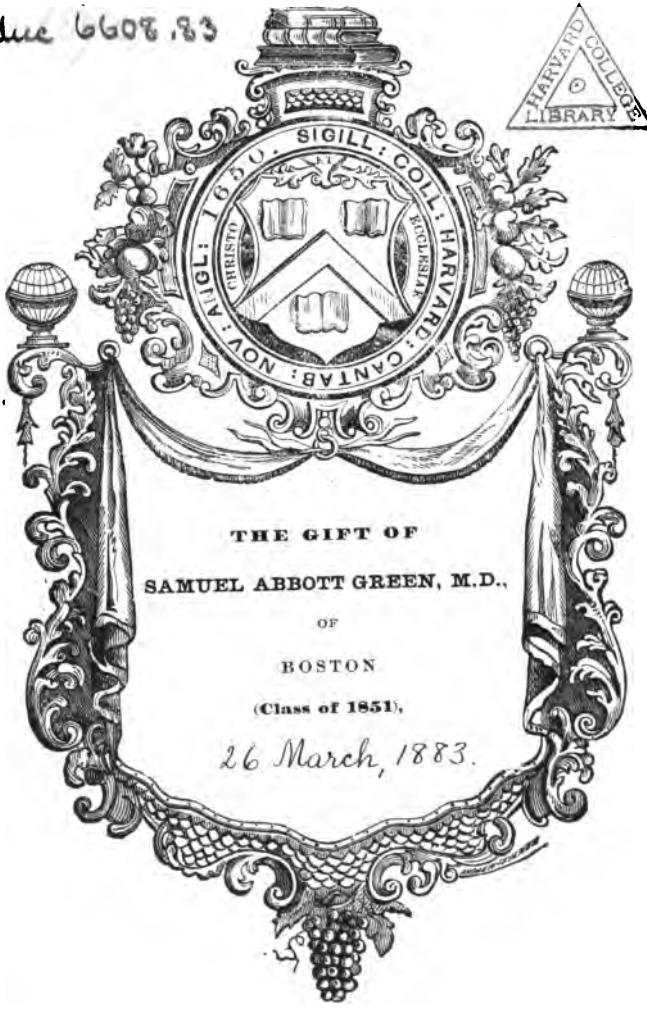

Industrial Education

A NECESSARY PART OF

PUBLIC EDUCATION.

A PAPER READ BEFORE THE AMERICAN INSTITUTE OF INSTRUCTION,
SARATOGA, JULY 13, 1882.

BY JOHN S. CLARK.

Manual Education

A FEATURE IN

PUBLIC EDUCATION.

A PAPER READ BEFORE THE NATIONAL TEACHERS' ASSOCIATION,
SARATOGA, JULY 13, 1882.

BY PROF. C. M. WOODWARD, PH. D.,
Washington University, St. Louis.

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COMMITTEE ON INDUSTRIAL EDUCATION.

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REPORT OF THE COMMITTEE ON INDUSTRIAL EDUCATION

Presented at the joint meeting of the National Teachers' Association and the American Institute of Instruction, held at Saratoga, July 13, 1882.

To the American Institute of Instruction:

Your committee chosen to investigate the subject of Industrial Education, and to report thereon to your Association, beg to submit the following as their conclusions and recommendations: —

Your committee are of opinion that there should be incorporated in the present scheme of public education broader provisions than now exist for imparting to our youth the elements of knowledge and skill required in the industrial arts: not alone for the development of those arts, but also as a part of the general system of public education, having for its object training for citizenship through the normal development of individual power.

To this end they would recommend: —

First, The introduction into public schools of proper appliances for the development of the sense-perception of pupils in regard to color, form, proportion, etc., by contact with models and with natural objects.

Second, The introduction into grammar schools of simple physical and chemical experiments, for the purpose of acquainting pupils, through original observation, with the elements of chemical and physical science and their common applications in the arts.

Third, The teaching of drawing, not as an accomplishment, but as a language for the graphic presentation of the facts of form and of matter; for

the representation of the appearance of objects; and also as a means of developing taste in industrial design.

Fourth, The introduction into grammar and high schools of instruction in the use of tools; not for their application in any particular trade or trades, but for developing skill of hand in the fundamental manipulations connected with the industrial arts, and also as a means of mental development.

In view of the fact that much misconception exists in regard to giving instruction in the several features recommended, and of the desirability of more information in regard to their practical introduction into the schools, your committee suggest a further examination into the general subject of Industrial Education and its relation to public education.

FRANCIS A. WALKER.
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J. W. PATTERSON.
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WILLIAM B. WEEDEN.
WILLIAM H. BREWER.
JOHN S. CLARK.

The above report was presented by Mr. John S. Clark, the Secretary of the Committee; and in support of the recommendations therein contained he read the following paper on "Industrial Education a Necessary Part of Public Education."

INDUSTRIAL EDUCATION

A NECESSARY PART OF

PUBLIC EDUCATION.

By JOHN S. CLARK.

WHAT education is, and how education should be applied, are questions by no means new. They appear with more or less distinctness in all forms of social organization. The training of youth is one of the primal considerations forced upon man in a primitive stage of development, it grows in complexity and importance with every step in his progress in civilization, until in the higher forms of social order it becomes of fundamental, if not of paramount importance.

Setting aside for the time being the idea of education prevailing among schoolmen, let us consider it briefly as a functional feature in the social organism.

Man does not live by himself, or for himself alone. Collaterally with the development of his individual freedom, there has been developed a constantly increasing dependence upon his brother man. He is ushered into the world under conditions which enslave him to the social needs of his time; he cannot emancipate himself from the demands of his social environment. While he is born an heir to the accumulated results of his progenitors, he is free only as he adds something to those results as the sum of his own life. His failure to make such addition brings loss of personal freedom; his refusal to do so entails social disabilities; his persistent refusal, social disgrace. No individual is born with an instinctive knowledge of the social acquirements, or of the social needs. While his share in the world's patrimony is undoubted, and while it will be meted out to him according to the prevailing laws of social exchange; he is yet born to his inheritance and his opportunities, utterly ignorant of the knowledge which enables him to appreciate the former, and utterly deficient in the power which enables him to command the latter.

The helplessness of infancy, and the long period of adolescence, have been among the main conditions which have made possible man's continued progress in civilization. Accordingly, the training of youth has not only been an important matter of public concern in nearly all forms of social aggregation, but the aims and methods of such training also reflect, more truly perhaps than any other one feature, the civilized status of the

tribe, community, or state. A brief examination of the methods of training youth among primitive races, of the educational ideas which were developed in ancient Greece and Rome, which prevailed during the Middle Ages, and which exist at the present time, would not only show that the conditions of social development in these respective periods are mirrored in their educational provisions, but would also bring into clear light the fact that by the training given to youth, more than by any other cause, is civilization developed and perpetuated, or hindered and destroyed.*

Education therefore, considered from the social standpoint, may be regarded as the reproductive function in the social organism; and the educational needs of any period or people should be considered with reference to the nature of the social organism to be perpetuated and developed.

With this general underlying idea of education as our starting-point, let us now consider for a moment the nature, or the type of social organization which it is our duty to perpetuate and develop to-day.

The basis of the present type of social order is individualism, — the freedom of each individual, — and the general tendency of social development is in this direction; so much so that in America and in some of the European states, social order is developing through the giving to each individual, freedom to think, freedom to labor, and freedom to exchange labor. The contrast between this type of social order and the militant type which preceded it can only be noted; the manner, however, in which individuals are ranging themselves in the fundamental social employments under the new conditions is a matter which should be of great interest to the educator, as well as to the student of social science.

Classifying these employments somewhat in the order of their functional activity, they present the following grouping: —

EMPLOYMENTS AT THE PRESENT TIME

Productive.	Those which contribute to individual and social necessities in the production of food, minerals, raw materials, building and machinery construction, industrial articles.
Distributive.	Those which contribute to individual and social needs by distributing the products of the productive employments, — trade and transportation, banks, bankers, etc.

* "We must settle what we want to make of the pupils, or everything will go at random. In every country of the world there is some sort of general notion of what the men and women in it ought to be; and the men and women turn out accordingly; and the more certainly, the more clear the notion is." *Miss Martineau, Household Education.* The author then points out the patriarch's idea of training youth some thousands of years ago; how the Spartan educated his child to become a perfect soldier of the state; a Jew, to obey the letter of the law; an Arab, to become a perfect horseman; an Indian, an independent warrior, etc.

Governmental.	Those connected with legislation, administration, and protection.
Professional.	Those connected with individual well-being, and the applications of literature, science and art, — education, law, medicine, divinity, journalism, designing.
Culture.	Those connected with the pursuit of science, philosophy, sociology, literature, art, — employments which tend to stimulate and enrich the whole organism.
Unclassified.	Domestic servants, unskilled laborers.

A comprehensive view of these activities shows that human thought is a vital force in them all, and that it is manifesting itself mainly in the subjection of the material world to the higher interests of man. It should be noted, further, that the productive and the distributive employments are the primal ones, that they minister most directly to the necessities of the organism, and that only through their broad and harmonious development the highest good of the organism arises.*

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* The employment of the people of Massachusetts, as shown in the carefully prepared statistics of the recent census, present some significant facts in regard to the tendency of modern social development. This State has an employed population of about 720,775, which may be classified broadly according to occupations as follows: —

Productive.	Agriculture	68,798
	Fisheries	6,103
	Manufacturing	344,686
Distributive.	Trade and Transportation	113,528
	Bankers, Brokers, Agents	4,857
Professional.	Teachers	12,129
	Lawyers	1,984
	Physicians	3,661
	Clergymen	2,434
	Designers	2,777
	Journalists	698
	Litterateurs	1,582
Governmental.	National, State, City, and Town Officials	6,274
Culture.	Educators	250
	Scientists	150
	Authors	136
	Artists	689
Unclassified.	Domestic Servants	74,354
	Unskilled Laborers	75,229

These figures show that nearly one half the employed population are in the industrial employments. The statistics of the employed capital and of the products of the State would make it clear that these are the really vital employments. The

In education, as in sociology, it is important that the reciprocal relation of these two primal groups should be clearly comprehended; and it should also be seen how differently thought manifests itself in them. Thought in the productive group creates values, mainly by the concrete work of the hand; thought in the distributive group is devoted to exchanging these values, mainly by the use of language. In the former, thought is expended in doing, in creating; in the latter, in describing and exchanging the things created. While each group is necessary to the other, the activity which benefits both is mainly generated in the productive group; on the other hand, the activity generated in the distributive group often proves fatal to both.*

Examining the productive group a little closer, we observe two main lines of activity in the creation of values: —

First, those connected with the gathering of food and raw materials.

Second, those connected with the fabrication of raw materials into articles for social needs; in other words, the industrial employments.

In both these divisions the individual is brought into direct contact with the material world; and in the industrial employments particularly, nature and nature's forces are converted by human thought into numberless products adapted to the necessities and the well-being of mankind.

A brief study of our present social development would show that its main activities are generated in the industrial portion of the productive group, that individuals are ranging themselves in these activities in a far greater proportion than ever before; and by subjecting nature and nature's forces to social needs, they have not only given increased activity to all the employments below them in the productive group, but they have pushed forward enormously the distributive employments above them, as well as laid under fresh contributions those higher activities connected with culture and individual well-being which minister to the best interests of the whole organism: so that, collaterally with this industrial development, we see men's thoughts expanding in every direction, resulting in greater achievements in science, the development of higher standards of public taste, of purer ideas in regard to morals and religious beliefs, and better types of political organization.

It is not necessary to catalogue the benefits, spiritual as well as material, which have come to the race as the result of this new social develop-

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political canvass which took place in the State as this pamphlet was passing through the press indicates something of the social dangers to be apprehended from so large a development of the industrial employments without a proper educational training back of them. The workers in these industries now hold the balance of political power in the State; and they made their power manifest in the election of Gen. B. F. Butler, governor.

* It would not be difficult to show that nearly all recent financial disturbances have arisen from an undue expansion of the distributive employments.

ment. We are all more or less witnesses to them. The conquest of thought over matter and material force has been productive of such rapid, brilliant, and far-reaching results that the imagination has oftentimes lost itself in the contemplation of the mere results achieved, and has not infrequently failed to appreciate the nature and the source of the thought itself. These, however, are but the vagaries of a great period of social development, — the general trend is in the right direction; and we have only to give human thought its proper recognition in these material conquests, to see that instead of there having been any conquest of matter over mind, there has been the greatest conquest of mind over matter the world has ever seen. A period of social development which produces simultaneously two such minds as Emerson and Darwin, and extends equal honors to both, cannot be charged with gross materialism or with undue idealism.

It is too much the habit of our time to depreciate the present as compared with some ideal social development of the past. We do not sufficiently realize how great has been the social advance in nearly all directions, and correspondingly how greatly individual responsibilities have increased. Says a brilliant writer in his "History of the Reign of Queen Victoria," "A man of the present day suddenly thrust back fifty years in life would find himself as awkwardly unsuited to the ways of that time as if he were sent back to the time when the Romans occupied Britain." And this is hardly an exaggeration.*

To claim for our type of social order, and the development which it has engendered, a superiority over all previous periods, is neither spread-eagleism, nor an undue Americanism; but to make this claim without considering the antecedents of this development and what it has cost, and without fully comprehending the responsibilities which attach to its preservation, would be to indulge in foolish rhetoric and silly pride.

Having seen that education should be the fitting of youth for their social responsibilities, it follows that the education of youth to-day should be a preparation for citizenship in this broad, this unexampled nineteenth-century civilization.

Turning now from the objective side of the question, — from what we are to educate the individual to, — let us look a moment at the subjective side, the physiological conditions which prescribe the educational development in each individual. The brain is the seat of individual power; and to this organism, as a distinctly defined objective point, are we obliged

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* "One peculiarity of this age is the sudden acquisition of much physical knowledge. There is scarcely a department of science or art which is the same, or at all the same, as it was fifty years ago. A new world of inventions — of railways and of telegraphs — has grown up around us which we cannot help seeing; a new world of ideas is in the air and affects us, though we do not see it." — *Bagehot, Physics and Politics.*

to direct our educational training. The brain itself is entirely removed from direct contact with the material world. Physiologists tell us that it is made up of white and gray nerve-matter, and that in the adult of civilized races the average weight is about fifty ounces. The latest researches of microscopic investigation reveal in this organism only material substance; and yet back of this material substance, eluding the most subtile analysis, there is born in every human brain the power which we call thought, which will in due time not only animate the material substance of the brain, but will also use this substance as the base and seat of power: first for the subjugation of its immediate individual environment, and then for conquests in the world at large.

While natural science offers no solution of the enigma, whence and whither this thought, and is silent as to its constituent elements, we are forced to recognize its existence and the manner in which it is generated. Without entering into either metaphysical or physiological details, we may say that the real aim in education is to get at this power of thought, to stimulate it to activity and give it means of expression; and to do this we have to study the nature of the material physiological organism which enshrouds it. Studying the nature of this organism, we have to observe that its connection with the outer world is by means of servants, the senses; that it is stirred to action, to the generation of thought, primarily through these servants: and it follows from this fact that the nature, the quality, and in a great measure the quantity, of the thought generated and expressed, depends largely upon the manner in which these senses are trained to become faithful servants to the brain. This point needs no elaboration. It will readily be admitted that the eye which cannot distinguish form, color, proportion, distance; that the ear which cannot distinguish different properties in sound; that the tongue and the hand which cannot express the thought which is generated, — are one and all incompetent servants to the brain, and obstruct the healthful development of thought.

Thus much being true, we have to note two functions which these servants perform in the service of the brain. The first is in carrying information or phenomena to it as food for thought; the second is in carrying from the brain the thought generated. A brief examination shows that information is conveyed to the brain by all the five senses, while for conveying thought from the brain only two organs of these senses are made use of; viz., the tongue and the hand. It follows from this that the proper equipment of the brain requires that the tongue and the hand should have such special training as to be able to convey whatever thought may be generated.

Referring now to the social organism we have been considering, we have to note that the social needs require the expression of thought, concretely by the work of the hand in labor, particularly in the productive employments, and abstractly by the use of language in the other employ-

ments; and we have to note further that the activities which require its expression by the use of the hand in labor are as fundamental to the best interests of the organism as those which require its expression by language. It follows from this that the educational training of our youth to-day should include a training to express thought by the labor of the hand as well as a training to express it by language.

The pertinent question now arises, Are the aims and methods prevailing in public education in conformity to the physiological conditions of individuals and to modern social requirements?

To answer this question properly, we should have a clear conception of what these aims and methods are, and also some acquaintance with their historical development.

If the statement were made that the aim of the prevailing education was not practical training for citizenship, it would be resented with some degree of feeling. It would be insisted that it has, for its main object or aim, preparation for citizenship. If the inquiry were pushed as to how it fits for citizenship, the reply would be, By the complete and harmonious development of mental power: and with this vague phrase it would be assumed that the whole field of practical educational training was covered.

If, however, we push the inquiry still further, for the purpose of seeing how this mental power is developed, and what the outcome is, two things will be apparent: —

First, That this mental power is not generated so much by the action of the senses upon the brain, — by direct contact of individuals with their material environment, — as it is through the memory and imagination by the use of words, which record the acts and the thoughts of others.

Second, That the outcome of this means of developing mental power is confined mainly to a second-hand knowledge of nature and human life, and is limited to the power of expressing thought by words alone.

The result of such education is mainly intellectual in its character. It pays little or no respect to labor as such, — to the training of the hand to become the servant of the brain in labor. It exalts thinking above doing. It tends to dissociate the ideal from the real, to engender false ideas in regard to man and his social duties, and consequently to perpetuate a repugnance to skilled labor, the great fulcrum upon which our modern civilization rests.

The charge that the prevailing education engenders false ideas in regard to labor is so frequently made, and is so strenuously denied, it is well worth our while to examine closely into the facts in the case.

Notwithstanding the great advances which have been made in all branches of social development since the period of Greek culture, comparatively little advance has been made in the object of mental training. The youth in all civilized states are to-day more under the influence of the educational theories of Plato and Aristotle on this point than of any

other thinkers or educators since their day.* Such has been the weight of authority attaching to these two great minds of antiquity, that although their ideas of education were developed under a social organization widely different from our own, their opinions as to what knowledge is of most worth, and their belief that mental training should be entirely dissociated from the affairs of practical life, are still of binding force. Neither of these thinkers had the conception of a social order based upon the citizenship of our modern development; the rank of the Athenian citizen, for whom their education was intended, was not unlike that of the English gentleman of our time; and their conceptions of education, therefore, were permeated with ideas of class distinctions wholly antagonistic to the individualism which prevails to-day. Possessing only rudimentary knowledge in regard to natural science, which is but the thought of man in regard to the material world, they were able to give instruction only in the most meagre way in regard to man's natural environment; and with their openly expressed disgust for manual labor, they crippled the development of human thought, save in the direction of literature, art, politics, and metaphysics.†

The writings of both these great thinkers abound in expressions showing a contempt for the common avocations of life: Plato affirming that "human affairs are hardly worth considering in earnest," that "the study of number is valuable only for the sake of knowledge," and "that geometry should not be taught for any practical purpose," Aristotle is equally emphatic on this point, saying that "employments used for gain take from the leisure of the mind and render it sordid."

The recognition of class distinctions in social life, and the endeavor to limit educational training to literary and metaphysical studies by the dissociation of thought from nature on the one hand, and the condemnation

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* It is only necessary to examine the curricula of the German schools, of the great English public schools and universities, and of our own leading colleges, to see how large a proportion of the instruction is devoted to language, literature, and abstract mathematics, the chief branches recommended for study by the ancients, to feel the force of this apparently hyperbolical statement.

† "Of the work necessary to the well-being of a state, Plato thought that there were three principal kinds, — the work of producing the material commodities essential to life, the work of protecting the state against external enemies and of preserving order within it, and the work of legislation and government. For the class of citizens engaged in the first kind of work he apparently did not think that any public system of education was necessary, — a fact which, however much at variance with modern ideas, will not startle any one who is familiar with the position of the industrial classes in Greek society, and with the opinions entertained of them, both by the public and by philosophers. It was then for the classes who are engaged in military and political functions, that is, in what a Greek would consider the functions of a citizen proper, that the education sketched in the earlier parts of the Republic is exclusively intended." — *Theory of Education in Plato's Republic, by R. L. Nettleship, Fellow of Balliol College, Oxford.*

of labor or skill as a means for expressing thought on the other, can be traced through all forms of education since the time of Plato. These false ideas completely permeated Roman education, as is seen in the works of Cicero and Quintilian. They held undisputed sway during the Middle Ages, as the famous Trivium and Quadrivium abundantly show; and they hold a preponderating influence at the present time, as is indicated by the meagre attention paid to the study of nature in public education and the general absence of provisions for industrial training.

We must not ignore the fact that there have been many protests against this training in mere words, against this literary or humanistic education, as it has been called; and the history of education in modern times presents the names of Comenius, Bacon, Locke, Milton, Montaigne, Rousseau, Pestalozzi, Froebel, as radical educational reformers, who sought to bring the training of youth more into conformity with modern requirements. Such, however, has been the hold of the humanistic idea, from the university to the primary school, that the influence of these great thinkers has been unable until our own day to make an appreciable impression upon the public mind; and even now their ideas are only beginning to be appreciated.

Our brief survey, therefore, brings out this fact: that while we have entered upon comparatively a new order of social development, which brings new duties and new responsibilities to each individual, we still cling in our ideas of education to methods of mental training which were developed under entirely different social conditions from our own, and which tend to develop ideas of social life antagonistic to the fundamental principles upon which our present social order is based. Hence there is a conflict between the old and the new; and the very wide-spread feeling of dissatisfaction which exists in regard to the outcome of the present educational training is because it does not conform to present needs.

But it may be asked, What is the evidence upon which the present education is condemned? Does it come from discontented tax-payers, representatives of class distinctions, or from the literary critics who have found in our public schools imaginary sources of all our social evils? By no means. The criticism from such sources is hardly worth considering. The greater part of it is animated by a spirit more or less hostile to all public education save of the meaner sort. The real objection is deeper and more fundamental, and is rarely expressed with clearness. It is not that the schools attempt to teach too much, but that their methods of instruction are defective; not that they fail to develop mental power, but that the kind of mental power developed is not broad enough and practical enough — in short, not high enough — to satisfy the demands of citizenship to-day. The evidence on this point is shown by the fact that we are sending from the schools so few pupils fitted to become workers in the social organism in other than the mercantile and professional occupations. We have seen by our study of the social

organism that the industrial employments are not only calling for an increasing proportion of the population, but that the nature of these employments requires a high degree of thought, generated by an observation of nature and expressed by the skill of the hand. Now, it is a fact which can easily be demonstrated that comparatively few of our public schools give sound instruction in natural science, or present labor in the industrial employments as honorable as in the mercantile or professional ones; hence our American youth enter these employments only on compulsion, and the scarcity of well-educated American mechanics is one of the anomalies of our present industrial development.* A case in point well illustrates this fact.

The Board of Education of Chicago advertised a few weeks since for a number of persons with a sufficient knowledge of reading, writing, and arithmetic to take the census of the public schools at the rate of two dollars and a half per day. Immediately five hundred persons applied to do the work.

Now, Chicago is one of the busiest cities in the world. It is a place where any person capable of doing intelligent work with his hands can readily find employment. Indeed, the difficulty is to find intelligent workmen at wages ranging from three to five dollars per day; and yet we find here a great superabundance of people, well trained mentally, who would feel it derogatory to engage in any mechanical employment, and yet desirous of selling their services at two dollars and a half per day.

Any one who has had experience in business knows how easy it is to get persons capable of doing any kind of clerical work. Indeed, it was not an extravagant statement of a New England manufacturer, that it was far easier for him to get a clerk in his counting-room capable of making a good translation of the Iliad or the Æneid, than it was to get a workman in his factory capable of running his machinery.†

The general tendency of the instruction in our schools was well illustrated recently by a test applied to the public schools of Boston and of Quincy, Mass. The editor of the Boston *Herald*, much interested in this question of practical education, had submitted to the pupils in various schools as the subject of a composition this question: "What is my school

* The industrial employments now offer for young men far greater opportunities for honorable and successful business careers than any other lines of employment; but success in industrial enterprises demands, as an essential part of an educational training, a knowledge of materials, a knowledge of drawing and applied science and mechanics, and a practical acquaintance with the use of the fundamental tools by which skilled manual labor is produced.

† It would not be difficult to get evidence on this point which would be striking, from both an educational and social point of view. One instance will suffice. Not long since a legal firm in Boston advertised for a copying clerk, and within a week over three hundred applications from men and women were received, nearly all well written, and some of them piteous in their appeals for wages far below what women receive in many branches of industry.

doing for me?" Thirty-one of the compositions were printed, and the striking fact in regard to them was, that the writers were all looking to the mercantile and professional employments for their future occupations; and they told with perfect unconsciousness how well their schools were fitting them for those occupations. Although many of the pupils were children of the wage-earning class, only one, and this a girl, so much as alluded to the possibility of getting a living by a trade; while one Irish boy admitted with complete frankness that, as the result of his school training, he hoped to be lecturer, orator, "representator," and perhaps President of the United States.

Comparing, therefore, the needs of citizenship at the present time with the outcome of our educational training, we observe a great want of harmony between them. It is true that various efforts have been made to bring our public education more into conformity with the needs of our time, and various new studies claimed to be of a practical character have been introduced; but it will be seen on examination that most of these efforts have ended simply in extending the curriculum of abstractions in the schools, rather than in modifying the methods of generating thought and giving it greater power of expression.

Our prevailing education, therefore, being practically out of joint, what is the remedy? The obvious answer is, Bring it into conformity with the social and individual needs of the time, so that it shall give us the good citizen through the normal development of his individual powers for both thinking and working.

A course of educational training having this end in view would present the following features: —

First, The bringing of the individual in contact with nature and material things, as the starting-point for training the senses to become accurate servants to the brain, and storing the mind with elementary ideas of the quality of things, originally obtained.

Second, Such continued study of nature as leads to natural science: which is the classified thought of man in regard to nature and the forces of the material world.

Third, The study of literature, art, history, government, mental and moral philosophy, for the development of ideas in regard to man and his institutions.

Fourth, Collaterally with this training of the senses, this study of nature, and this study of man, there should be proper training in the use of language (inclusive of the language of number and form) for the purpose of receiving and expressing thought abstractly; and also proper training of the hand in the use of tools for the purpose of expressing thought concretely.*

* The tools here recommended are such hand and machine tools as are used fundamentally in the manipulations of wood, stone, and metals, — the hammer, saw, plane, chisel, gauge, square, file, lathe, planer, milling machine, etc.

The elaboration of the details of a course of educational training which will bring these features into harmony with one another will require much thought and much experiment in the schools. If the course be conceived in the proper spirit, it presents nothing really antagonistic to what now prevails; rather it will be seen to correct and supplement the prevailing literary education. By making nature the starting-point in intellectual development, the study of words will be relegated to its proper sphere, and science, literature, history, philosophy can then be given a harmonious development which will result in juster and nobler ideas of man and his institutions. By adding to language training the training of the hand to manual labor, the activity of thought will be greatly accelerated; and, by displaying itself in concrete as well as abstract form, the beneficent influence of art will be given free play, and new industrial creations will meet new or expanding social needs, thus giving dignity to whatever is produced by human hands.

That the tendency of the time is toward a general educational training, such as is here indicated, will be apparent to any one who studies the general drift of educational discussion. The failure or ill-adaptedness of our old methods of dealing with abstractions, and of developing the power of expressing thought by words alone, is patent on every side; and it will not be a difficult matter to conform present education to the new requirements when the conditions of the problem are fairly comprehended.

A course of study to meet these new demands has been pretty well worked out for our primary education, including in this term primary and grammar schools. The new features necessary to be introduced into the schools may be outlined as follows: —

First, The introduction into primary schools of methods of teaching whereby children will be brought into contact with objects or things through their senses, for the purpose of developing their perceptive powers in regard to color, form, quality, and size of common objects; and whereby they will be trained in the use of language, number, and drawing, to express abstractly their conceptions in regard to these objects, and by moulding and other forms of work to express their conceptions concretely.

Second, The introduction into grammar schools of (*a*) Experimental observations, which shall illustrate common physical and chemical phenomena, and their application in such practical things as the lever, wheel and axle, inclined plane and pulley, pump, barometer, siphon, water-wheel, telegraph, etc. (*b*) The study of geography so presented that man's relation to the material world in his industrial, commercial, and governmental activities shall be clearly emphasized. (c) Exercises in drawing, which shall be the graphic representation of facts in regard to objects both real and imaginary, as well as the representation of their appearance, thus leading to working drawings. (*d*) Instruction in the use of hand tools in

wood and metal, not for application in any particular trade or trades, but for developing skill of hand in the fundamental manipulations connected with the industrial arts, and also as a means of mental development.

In schools giving secondary instruction, — High Schools and Academies, — the proper adjustment of the industrial requirements to the existing course of study has yet to be worked out. This is the problem which practical business men are asking you, as educators, to solve. The industrial training should have no issue with the literary training. We have seen that both are needed in a sound course of mental training. Both are equally demanded by the social conditions of any highly organized community. That the purely literary training is not broad enough to answer as a higher educational training for those who are to enter our ever-expanding industrial employments, which demand in a high degree the applications of natural science and also of skilled labor, is a fact which cannot be denied. To remedy this state of things secondary schools must provide a way to give broader instruction in experimental and theoretical science; and also in a generalized form, instruction in manual training, including the use of hand and machine tools, not in its application in any special trade or trades, nor as a training divorced from general intellectual culture, but as an essential part of a sound general education.*

That the introduction of these features into the different grades of schools would necessitate changes in their present curricula is admitted; but it is believed that no important feature would be sacrificed, rather that all the valuable features of the present instruction would be greatly strengthened. The change would necessitate less drill in spelling, and in writing as a fine art; less drill in technical grammar and the details of geographical nomenclature; less puzzling over arithmetical conundrums, — in other words, fewer abstractions; on the other hand, the minds of pupils, brought into direct contact with material things and forces, and trained to give expression to thought by language and by the creative work of the hand, would be quickened and stimulated to self-activity in various directions, and it has been shown that the mental power thus generated can more

* "We believe that scientific instruction ought not to stop with pure theory. We see a threefold advantage to be gained from this innovation, — for it is still an innovation; a physical advantage, for, in learning to make use of the plane, the saw, the hammer, and the lathe, the pupil will complete his gymnastic education, and will acquire a manual skill which will always be of use to him, whatever he may do later in life, and will prepare him for any apprenticeship; an intellectual advantage, for the thousand little difficulties which he will encounter will accustom him to observation and to reflection; and a social advantage, so to speak, for after having discovered from his own experience the qualities necessary to success as a skilled workman, there will be no fear that, however elevated the position for which fortune destines him, he will despise those of his fellow-beings who work with their hands." — *M. Paul Bert in his report upon the new law for primary instruction in France.*

readily be trained to the proper use of language and number, and to the study of history, literature, etc., than by the use of abstractions alone. It has also been shown that the development of mental power, by such means of generating and expressing thought, as have been indicated, not only affords the best training for the practical duties of citizenship, but is also the best possible training for the development of thought in the higher departments of science, culture, and philosophy.

To reach these results, two things are necessary: —

First, The public must be shown the importance of the new methods and what is intended to be accomplished.

Second, Teachers must be trained to give the instruction.

Educators should lead the way.

The practicability of introducing the methods and the features we have been considering into our schemes of public instruction has been proved by experience in Europe and America. In our own country the kindergarten methods, now becoming better understood, are steps toward the training of the senses; here and there experimental lessons in physics and chemistry for primary and grammar classes have already been given with marked success, as for instance in the normal and training school at Salem, Mass., and at the Oswego Normal School; and drawing has become a more or less prominent feature in nearly all our schools. Although educators have been strangely inactive in forwarding and adopting these detached efforts, they have come almost unconsciously to accept them as desirable possibilities for the great education of the future, and are now introducing them under other names.

The introduction of training in the use of tools, however, seems to many people impracticable and revolutionary.* They forget, if they ever knew, that industrial training has become the great and successful sanative measure in the schools connected with reformatory institutions; that one of the most popular characteristics of the Indian schools at Hampton, at Carlisle, Pa., and in Oregon is the industrial training; and that various isolated but successful attempts have been made at combining manual with intellectual instruction in various schools, public and private, both in the East and the West. Thus we have the School of Mechanic Arts of the Institute of Technology, Boston, in which nine hours per week of the students' time are devoted to shop work, and the balance to drawing and other studies; the Manual Training School of Washington University, St. Louis, in the second year of its existence, with one hundred and one pupils, to whom it gives a three-years' course in the use of tools, together

* "Every advance in the use of tools means not merely an advance in producing power, but an advance in civilization. You can read the history of the growth of human civilization in the history of tools, from the flint implement down to the last new complicated labor-saving appliances." — *Prof. S. P. Thompson.*

with an ordinary English high-school course (we are to have this afternoon a full account of the working of this school from its Principal, Prof. C. M. Woodward);* we have Prof. Adler's Workingmen's School in New York, with one hundred and fifty pupils from six to fourteen years of age, each of whom works four hours a week in clay, wood, or zinc, pursuing successfully at the same time the ordinary school branches; and we hear of classes in the industrial arts at Gloucester, Mass., at Jamestown, N. Y., and in the Dwight Grammar School in Boston.

Moreover, few among us are aware of the extent to which manual training has been adopted in Europe, particularly in Norway, Sweden, Finland,† Russia, Denmark, Austria, Germany, Holland, and France. While in England most of the experiments have been dictated by motives of philanthropy, on the Continent prominent educators have seriously considered and proved the value of the training from an educational point of view. In Germany, for instance, the cry to-day is, "Education *for* labor *through* labor." And although the movement only dates from 1879, the potency of the watchword, and the interest aroused among actual educators, led to the establishment of industrial courses in twelve of the larger towns in less than two years, and many other towns and villages have since followed suit. These courses are more or less closely connected with the school system, drawing their pupils for two hours a week from gymnasia and "real" schools alike, manual training being made an elective in many of the regular schools.‡

In Sweden the experiment is on a still firmer basis. The instruction forms an integral part of the regular school curriculum, and is given in regular school shops attached to each school, each pupil spending about six hours per week in the shops in addition to the twenty-six or twenty-eight hours per week of regular instruction. The results have been most encouraging, although the shops were only built in 1879.§

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* See Prof. Woodward's paper on Manual Training which follows on page 53.

† In Finland manual instruction has been compulsory since 1866, for boys from nine to fifteen years of age.

‡ In Germany much of the success of the movement is due to Herr Clausen von Kaas, who instituted a normal course at Emden, 1880, which was attended by sixty-two pupils. Most of these, aided by the local government, or by the industrial unions of their native towns, started school shops, or industrial classes in the course of the ensuing year. Herr Clausen von Kaas has held a second successful course at Dresden, this summer, from which further good results may be expected.

§ In Sweden, efforts are being successfully made to diffuse this education as generally as possible throughout the country. To this end, teachers are being trained in the endowed Normal Industrial School at Nääs; and normal courses of several weeks each are held yearly in the various districts, and are partly supported by the government, which also allows a certain stipend to each commune introducing manual instruction. Three hundred schools, in twenty-three different districts, gave instruction in the manual arts in 1880; and in 1879, 127,000 kr. were spent in the promotion of the movement, exclusive of private gifts.

In France, schools in which industrial training has been combined with elementary instruction have been numerous, there being forty-two in Paris alone. One of the most successful, perhaps, is the École Communale, or public school, of the Rue Tournefort, in which industrial training was made an elective in 1871. Each pupil spends from one to four hours daily in the shop during a three-years' course, the pupils being from twelve to fifteen years of age. The practical success and popularity of this and similar experiments is shown by the incorporation in the new French code of education of a clause *requiring* that the use of tools be taught to all pupils in schools of the grade of our grammar schools.*

The schools which have been mentioned by no means exhaust the list, but enough has been said to show that the introduction of manual instruction is no longer a problem; it is an actual and successful fact. Teachers of different countries unite in claiming from experience that manual instruction does not overcrowd and exhaust the children, but is of physical benefit to them; that it does not interfere with intellectual development, but rather sharpens and aids the mental faculties and proves of real educational value; that the expense, although varying in different localities, is by no means insuperable; and that these courses of instruction have already demonstrated their usefulness by sending out boys, young men, and young women, both willing and able to enter the ranks of skilled and lucrative labor.†

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* M. Laubier, the director of the Rue Tournefort school, says in a recent letter: "You ask me, if the manual work harmonizes with the ordinary work? Far from interfering with the ordinary work, I can assure you it offers valuable opportunities to teachers in vivifying, so to speak, their instruction; and it is also a most important aid in training pupils to comprehend what is explained to them. There are now forty-two schools in Paris where manual instruction is combined with pedagogic instruction. All the teachers agree in saying that they obtain good results, and that they have gained much under the new *régime* in order, care, and accuracy in work. I could quote a goodly number of our pupils who have distinguished themselves in the careers which they have chosen. What is really remarkable is that not a single one of them has changed his occupation; while changes are frequent among apprentices who have not been guided in their choice by school training." He also says that a course of industrial training for girls is being prepared.

† The literature which has sprung up abroad on this subject is both considerable and important. The predominating tone, however, especially on the Continent, is one of earnest devotion to the educational and social aspects of the reform, as distinguished from the economic aspects. The crying need of social reform has but to be mentioned to be appreciated in the midst of the social outbreaks which Europe has been witnessing during the last half-century; and it is perhaps this need which brings home the recommendations of the educational reformers of education for labor. It is not so much aggrandizement of the state which is sought, as it is peace within the state. The public is not urged to teach trades which shall make citizens valuable to the state from a commercial or an industrial point of view; but it is

In conclusion, it may be said that all the evidence so far accessible not only goes to show that it is possible to incorporate the elements of industrial education, including instruction in manual training, in our system of public education, but also that its introduction will at the same time strengthen all sound methods of intellectual training.

Industrial education therefore becomes a most important matter of public concern. If what is claimed for it be true, its introduction will secure the harmonious development of the mental powers of our youth in the two directions of thinking and doing, and thus prepare them broadly for citizenship under a social order which requires the expression of thought by the skilled hand in labor, no less than by the use of writing. To bring our public education into harmony with the needs of our time, we must through our schools dignify and ennoble manual labor by making it the servant of thought as expressed by skill. Too long has there been a divorcement between training for manual labor and methods or means of intellectual training. Antagonisms between the literary employments and those connected with manual labor have consequently been developed. To remove these antagonisms by bringing the instruction in our schools more into harmony with the requirements of labor in adult life is, therefore, not simply an educational or even an industrial question, — it is one that lies at the foundation of all social questions.

[Since preparing the foregoing paper the author has gathered additional information in regard to Prof. Felix Adler's school, 109 West 54th Street, New York, referred to in the text. Space does not admit of more than a mere reference to this school now; its establishment, however, is an undertaking that should receive the most attentive consideration from the friends of education. The underlying methods of instruction are those of the kindergarten; but these are carried forward beyond the kindergarten term, and developed through a course of study answering to the period of the ordinary grammar-school course. Throughout this course the expression of thought, by drawing and by the work of the hand with tools, is not only made correlative, but these two features of instruction are also carefully graded and brought into harmony with instruction in geometry, the natural sciences, art, and even ethics. It is the aim of the school to bring culture training and work training into complete harmony in primary education.

The conditions under which this school has been established are exceptionally favorable for a fair trial of the experiment. It starts with liberal means, and without an educational, religious or social bias in any direction. Its aim is to develop pupils normally into self-respecting and self-supporting members of society, thereby interested in all that pertains to the best interests of society. The disinterested motives which have prompted this school, and the earnest efforts of its director to have it fulfil its mission, should secure for the undertaking the hearty interest of all who are endeavoring to improve our public education]

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urged to educate each child into a contented, self-respecting member of society, healthy and well-balanced in mind and body, and capable of understanding the work of our present civilization.

DISCUSSION.

THE President stated that the subject of Industrial Education, as presented in the Committee's report and the paper which had been read, was open for discussion. He remarked that we were considering industrial education in its application to the whole country, and as there had been a presentation of some New England ideas on the subject, he thought it proper to turn to the West for the purpose of seeing what the current of thought was in that section; he therefore called upon Mr. James MacAlister, superintendent of schools of Milwaukee, to give his views on the subject Mr. MacAlister said:—

MR. PRESIDENT, LADIES AND GENTLEMEN: I can hardly imagine why one coming from the West should be asked to open this discussion, unless it is the design to show that the question of industrial education is one which pertains to the whole country, not, as is often stated, to New England alone. Besides, the paper read by the Secretary of the Committee, Mr. Clark, is so complete in its presentation of the subject, and the positions taken have been so well guarded on all sides, that I cannot see what there is left for me to say, agreeing as I do with the gist of the argument, and concurring in the main with the recommendations submitted by the Committee. For this reason, also, it will be difficult for me to speak on the subject at all without going over ground which has already been covered by the paper. It would be much easier to hunt for some weak spot in the reasoning of the essay than to enlarge upon the principles and illustrations which it so fully and satisfactorily sets forth. Two or three points, however, occur to me which may serve to bring the question more fully within the domain of the school-room, and to open the way for its discussion by those directly engaged in the work of education.

May I be permitted to remark, in beginning, that there are few institutions more conservative than the school? The schoolmaster has moved about the slowest, and is among the least disposed to go forward, of any class of men engaged in carrying on the great activities of life. There has been very little change in the ideas which have controlled our methods of education, and these ideas were formed something like four

hundred years ago. Like nearly all the great agencies of modern civilization, the established system of education dates from the Renaissance, and the direction given to the schools at that time has been followed with but slight modification ever since. It is unnecessary to point out to this audience what were the characteristics of that important epoch, but I may be allowed to remind you that its most distinctive feature was the return to the culture of the classical nations of antiquity. In discussing the question now before us, we should not forget that it was the extinction of Greek thought and Roman law that brought upon Europe those dreadful centuries of darkness, when all the progress the world had made in knowledge and refinement seemed about to disappear forever. For seven or eight hundred years the splendid achievements of the two nations, which have done more to fashion the mind and character of the civilized world than all other influences put together, were lost and forgotten. The literature, art, and philosophy of Greece ceased to form a part of the consciousness of men. It was the restoration of this classic culture, and the new birth of the human mind which resulted therefrom, that lifted man once more into a realization of his inherent worth and dignity; that recreated within him a sense of his true place in nature, and opened his soul to its elevating influences; that brought forth all that wealth of power and beauty which has been growing and spreading throughout the world ever since. [Applause.]

It is necessary to bear these things in mind to understand the methods which found their way into the schools that took their rise at this time. When the men of Western Europe began to read Homer and Plato and Sophocles and Thucydides once more; when they began to know Virgil as something different from a wizard, to feel the glowing style of Cicero, to study Roman life in Horace, to read Roman history in Livy and Tacitus, they were so fascinated with the works of these great writers that they cared for nothing else. The humanists, with their glorious enthusiasm for the classic authors, were the natural outcome of the revival of learning. It was inevitable that they should set an incalculable value upon the literary productions of Greece and Rome. The exhaustless wealth of thought, the exquisite beauty of style, which they contain are still a marvel to us. How overpowering, then, must have been their effect upon the ardent spirits to whom they were first opened!

It was in the midst of this intellectual ferment that the modern school was born; and you know what was the result. The study of the classical languages was made the almost exclusive occupation of the schools. In this particular all the schools were alike, the schools which were founded by the reformers, as well as the schools of the church in whose bosom the Renaissance had been nursed. The Protestants could have got no hold on education if they had not followed the Catholics in drawing up the curriculum of their schools. Melancthon was a humanist, and when John Sturm, the leading Protestant pedagogue, came to put the new

ideas into form, he founded a system which was purely humanistic. The model which Sturm set up was adopted everywhere. John Colet established the English schools upon the same plan. The education planted in the American colonies differed in no particular from that of the mother country. The pattern which Sturm furnished has undergone but little change down to the present generation; and in spite of the reforms that have recently been introduced, it is in the main the standard applied in estimating the character of all our higher education, and still controls, to no inconsiderable extent, the instruction provided in the schools of lower rank.

I have ventured to detain you with these general remarks upon the rise of the humanistic education, because a proper understanding of the influences which operated in shaping its origin will serve, I think, to account for the hold which it still retains, and the difficulty experienced in getting a fair hearing for the claims of industrial education. I wanted also, if possible, to offer some reason for asking the more strenuous advocates of industrial education to be a little more liberal in dealing with the defenders of the classical system. It is not to be inferred, however, from what has been said, that the movement in favor of making industrial training a part of education has sprung up like a mushroom. Its germs were planted long ago in fruitful soil. The Renaissance means more than the restoration of the Old-World culture. It means also the discovery of nature, from the knowledge and enjoyment of which man had for centuries been almost entirely shut out. And so Bacon, with his new philosophy, came out of the Renaissance by a process of orderly development to teach the true method of investigating the laws of the natural world. The Baconian philosophy led to the study of things in opposition to the humanistic study of words, and the issue then joined has been maintained ever since. Out of the inductive method of obtaining knowledge grew Locke's philosophy of mind, and Locke's doctrines made possible a true science of education. He first of all treated the human mind as a natural thing,— showed the mind's relation to the external world, and first of all, as I take it, insisted that man was to be educated by contact with things. The reasoning of the English philosopher was applied to the training of the young by two men widely different in character, but both of whom have exerted an extraordinary influence upon the progress of education, — Rousseau, the French sentimentalist, and Pestalozzi, the Swiss schoolmaster and real founder of all that is best in the primary-school work of the present day. The Kindergarten of Froebel was the natural product of Pestalozzi's teachings; and Froebel has formulated a system in which the earliest education of the child is based exclusively upon nature, and all learning grows out of doing. [Applause.]

We see, therefore, that while the humanistic system of education has been the controlling influence in the schools of Europe and America ever

since the modern era of culture began, there has been silently growing up a counter theory, which has now become too strong to be put aside by a wave of the schoolmaster's hand; and it is here to-day, demanding in no uncertain voice the recognition of its rights. [Applause.]

We are, therefore, brought face to face with the question as to what education means. That is really the problem that is before us for discussion. I have the temerity to believe that there is no occasion for any wide divergence of opinion on the subject. If the question could only be properly stated, we should not fall out greatly in arriving at a conclusion. If we were debating what is ideally the best form of education, there would not, I am sure, be the slightest difference of opinion in this gathering, or in any convention of educators. I take it for granted we are all agreed that the ideal of education is the harmonious development of all the powers and faculties of man's nature. But we are not discussing what form of education is best in the abstract, but what system is needed under the existing conditions of society, what kind of schooling is best adapted to minister to the well-being of the individual and the prosperity of the community of which he forms a part.

Now, it seems to me that it has been conclusively shown in the paper just read that the productive employments are more and more monopolizing the activities of the great mass of men. If this be so, the problem which educators are called upon to solve is whether we are to continue methods of training in our schools, which originated when society was very differently constituted from what it is at present, or whether the time has not come when these methods should be so modified as to fit men and women for the circumstances under which they are to live in the world. We have only to look at the facts of history with an unprejudiced mind to discover that, in spite of all our theorizing on the subject, this has practically been the course followed by all the nations which have pretended to do anything for the education of their citizens.

Some rather disparaging words concerning Plato and Aristotle have been spoken here this morning. It is a mistake, I think, to blame these great thinkers for the ideas of education which they held. They elaborated the Greek system of education, which consisted of music and gymnastics, — terms which, I need not say, had a wider signification to them than what they bear now. This kind of training was well and good in its place. It produced a type of manhood which, in some respects, has never been equalled. The Athenians who gathered in the Pnyx to listen to Demosthenes were as splendid examples of enlightened freemen as the world has ever seen. But I think the point was well taken that the views of these two great masters of Greek philosophy should not be allowed to dominate the schools of to-day. There is a vast difference between the Athens of Pericles, with its "sweet reasonableness," and the structure of civilized society in our own time. The education of the present must be

shaped to suit the needs of the industrial masses, if it is to fulfil its proper function in the state. We must not close our eyes to the fact that by far the larger number of men in every civilized community are workers, to whom a skilled hand is quite as important as a well-filled head. Is it not within the strictest bounds of justice and right to ask that the schools should undertake to do something for the practical necessities of these millions of men and women? [Applause.] I repeat, that, so far as public education is concerned, it is the interests of the many, and not of the privileged few, that must be provided for.

Take the public schools of my own city as an example. The first (that is the lowest) grade contains nearly forty per cent of the total enrolment. In the eighth or highest grade there is only about two per cent of all the pupils in the schools. The high school has about the same percentage as the eighth grade. In the Eastern States I presume the proportion of the advanced, which is the same thing as saying the older, pupils is considerably larger; but these figures will stand as a fair representation of the larger cities of the West. How is this marked difference in the attendance of the pupils to be accounted for? What has become of the children? The answer is very simple. Before the middle grades have been finished the greater number of these young people have been taken from school and put to work. If you should stand at the business centre of Milwaukee at six o'clock in the evening, you would see thousands of boys and girls of tender age, hurrying, dinner-basket in hand, from a hard day's work to the homes which they had left in the early morning. The school door has closed upon them forever, and they must find their way through the world with such scanty intellectual equipment as has been crowded into five or six years of their childhood. With such facts as these staring us in the face, is it not a duty to pause and inquire whether the character of the education given to these masses of children is just what it ought to be; whether it would not be possible, by adapting it more fully to their actual necessities, to give them a better start in life? It is useless to talk about compelling a longer attendance at school, unless some compensations of a practical kind are offered. Doubtless many of these children are the victims of parental cupidity, of the efforts of manufacturers to cheapen commercial products by the employment of juvenile labor; but in the larger number of cases their withdrawal from school is a dire necessity. But we cannot stop to inquire into these causes. Our immediate duty is to remodel our elementary courses of instruction in such a way as shall make them tell more directly upon the interests of those for whose benefit they are intended.

It must be clearly apparent to any one who takes an impartial view of these things that it is not so much a question as to whether the old ideas of education are of any value, as whether they are sufficient for the present age. Nothing which I have said should be construed into a disposition to make war upon classical culture. I believe the world could not

live without it. [Applause.] I believe that the poet of the "Iliad" and the "Odyssey," the philosopher of the Academy, the historian of the Peloponnesian War, are just as important to us to-day as the scientific discoveries of Watt, Faraday, and Morse. I do not see why there should be any difficulty between the classicists and the scientists, why there should be any antagonism between the literary school and the industrial school. The glorious culture of the ancient world, with all the precious fruit it has borne in the modern world, must be kept alive if nobility and beauty and refinement of mind and character are to be cherished as things worth striving for. [Applause.] I came across a remark in an eloquent writer the other day, that "except the blind forces of nature, there is nothing moves in the world that is not Greek in its origin." This is a very strong statement, but I feel that it is hardly possible to exaggerate our indebtedness to the people which made Athens the one city that can never perish from the memory of men. [Applause.] It will not do for those who are battling so courageously for the rights of science to forget that its mighty achievements would soon fade away, that the very classes for whose interests they are so unselfishly laboring would soon lose that sense of human worth and dignity which is the best safeguard of their rights, if the culture which has been the inspiration of so much lofty thought and noble action were to be obliterated from the consciousness of the race. [Applause.]

It seems to me then, ladies and gentlemen, that the real question with which we have to deal is, What is it best to do for this great mass of young people who leave the schools long before there is any opportunity for benefiting by this higher culture? I am speaking, you will perceive, of primary education; but the question just put will apply, to a very considerable extent, to the secondary schools as well. There is no doubt a large amount of waste arising from the persistence with which the old humanistic model is still followed in our high schools and academies. But the classicists will not listen to any suggestion of change in this respect. It was only this morning that a friend said to me in talking over this matter, "Taking your own estimate of the value and importance of classical culture, why not put as much of it into the schooling of every child as you can get? Cut off one quarter of it,—if you like, one half of it: the boys and girls will be better off with what is left than they possibly can be with any other form of education." I do not believe it. When the late distinguished senator from my own State came to Boston to study law, he went to Rufus Choate and asked his advice about devoting himself to the study of the classical languages as a means of cultivating his literary taste and power of speech. The great lawyer inquired what length of time his young friend could afford to spend upon Greek. Carpenter's reply was that he did not know, but that he hoped to be admitted to the bar within two or three years. Mr. Choate said, "Unless you can afford to give ten years of hard work to the classics, you had

better not attempt them at all; your three years' labor will be lost time. You had better devote these three years to the study of Shakespeare and Milton, and the English Bible; these writers will give you the culture you covet much better than the smattering of Greek or Latin you can hope to acquire in so short a period of time." [Applause.] How well Mr. Carpenter profited by this advice must be known to every one who has ever had the privilege of listening to his rich and powerful eloquence. I mention this incident because it gives the deliberate opinion of a man who was an enthusiastic Greek scholar as well as a learned lawyer; a lawyer who, after his hard day's work in the court room, was in the habit of burning the midnight lamp that he might nourish his indomitable spirit on the resounding Philippics of the Athenian orator and the "moving accidents," of the "tale of Troy divine." [Applause.]

I am fully persuaded, therefore, that some radical changes will have to be made in the character of our public education. In saying this, I mean the education of the whole country; not of New England alone, but of the West as well, where gigantic industries are springing up, and where the conditions of existence are not going to be so different from those of the East as our Massachusetts friends are disposed to believe. I must repeat again that these changes do not mean the extinction of the classical system. The demand is simply that the primary schools shall be made to conform to the existing necessities of the people, and that side by side with the higher institutions of learning there shall be established schools where the sciences, in their relations to the arts and industries, shall be made specific branches of instruction and training.

Let me say here, by way of anticipating any attack which may be made upon this position, that I do not mean that a less amount of education should be given in these schools than is provided under the present system. All that is required is that it shall be different in kind, and that the practical purpose to which the school is to be put shall be kept steadily in mind. I cannot stop now to notice the objection often made to the use of the term "education" in connection with any kind of training other than that of the mind. I must protest, however, against the assumption that the craftsman is a mere machine, and that there is no intellectual advantage to be had from manual training. Was there no mind in that wealth of beauty which the workman lavished upon the commonest articles of daily use in the Italy of the sixteenth century? Was there no culture in that happy period for the worker when Labor was still the companion of Art? I must confess to an inability to understand the opposition which so many people keep up to any attempt to extend the limits of the school beyond what in stereotyped phrase are called the "common-school branches." Take drawing for instance, a study only secondary in importance to the traditional "three Rs." It has been a hard fight to win even the partial recognition accorded it in a few cities of the United States.

It is an egregious mistake to suppose that those who favor manual train-

ing wish it to take the place of mental training, or are seeking to deprive any class of pupils of the portion of intellectual culture they now receive. But I would like to know why the hand should not be trained as well as the head? The perfectly educated man is he whose facile hand follows obediently the clear and ready promptings of a well-developed brain. The hand is the most marvellous instrument in the world; it is the necessary complement of the mind in dealing with matter in all its varied forms. It is the hand that "rounded Peter's dome"; it is the hand that carved those statues in marble and bronze, that painted those pictures in palace and church, which we travel into distant lands to admire; it is the hand that builds the ships which sail the sea, laden with the commerce of the world; it is the hand that constructs the machinery which moves the busy industries of this age of steam; it is the hand that enables the mind to realize in a thousand ways its highest imaginings, its profoundest reasonings, and its most practical inventions. [Applause.] Why, then, this disparagement of the hand in the schools? Why should not an organ which forms so vital a part of man's being receive a due share of attention in preparing him for the duties and responsibilities of citizenship? There can be no question about the harm that is done to society by this neglect. The trouble with so many departments of industry at the present moment is, that there are too few skilled artisans to put into form the ideas of the designers, that labor and thought are too far apart from each other. One reason why there is so much unrest among the working classes is, that our public education does not give them all the help they need to enable them to pursue their work successfully and happily.

It is a great deal easier, however, to state the desirability of these reforms than to tell how they are to be accomplished. It will do no good to say that there are no difficulties in the way. But if the teachers could only be brought to believe in the necessity of manual training, and would set themselves resolutely to work to make it a part of the public-school system, it would be a comparatively easy matter to invent the methods and appliances for putting it into practical operation. The interesting information furnished by Mr. Clark shows what has already been done abroad, and the hopeful beginning which has been made in a few places in our country. There need be no fear, I think, about the primary schools. The suggestions made in the paper seem to me eminently wise and practicable. No better start can be made than by placing the Kindergarten at the basis of the school system. If that can only be effected, all the rest will follow as a matter of course. There surely cannot be any dissent from the proposition that a larger amount of scientific knowledge should be given in the elementary schools. I do not mean that kind of science instruction which looks so well in a programme of study, but when you get inside the school-room, resolves itself into cramming the pupils with facts and figures from a book or the dictation of the teacher. I have known an elaborate scheme of oral instruction in physiology and

physics laid down in a course of study, of which the class-teacher into whose hands it was put knew but little more than the pupils, and for whose use not so much apparatus had been provided as she could put into the crown of her bonnet. But in such cases our criticism should not lie so much against the well-meaning instructor as the school authorities, who think to quiet their own consciences and appease the public demands by making a show of providing knowledge for the children. The desideratum here is an outline of the fundamental principles of natural science prepared by a master mind — it takes a Huxley to write a Primer of Biology — thoroughly acquainted with the conditions of our primary education; such an outline as can be taught by any regular teacher imbued with correct ideas of scientific method. The school-room should be supplied with an assortment of the simplest possible appliances for the illustration of the lesson; the "nickel-plated apparatus" is an abomination. Such a plan would require neither profound learning on the part of the instructor, nor a large outlay of money, to carry it out. If the normal and high schools did their work properly, the teacher would be ready for her duties, and school boards would find it a matter of economy to substitute the few simple articles required, for the expensive and useless trash that is found in so many school-rooms.

In this way, it appears to me, a substantial foundation in the general principles of the sciences which stand most nearly related to the industrial occupations might be laid; and if the Kindergarten idea of learning by doing were carried up into the primary school, and systematic exercises in manipulating clay, wood, and iron were also added to the existing curriculum, all that the friends of manual training have any right to demand would be secured without causing any terrible revolution of the existing system. No doubt, some elimination of the multiplicity of useless detail in the courses of study would have to be made, but that would be a blessing which should be welcomed at any price. Trouble would be more apt to arise when we got to the secondary schools. This is the ground on which the battle between the classicists and the scientists, the idealists and the realists, will have to be fought out.

I am so anxious not to be misunderstood on this point, that, at the risk of tedious iteration, I want to say that, to my mind, the proposal to carry manual training into this stage of the course of study does not mean any injury to the high school. I have great faith in the high school. I hold that any system of education which does not include the high school is defective in a vital part of its organization, and cannot meet the claims which the public — the poorest man's son as well as the richest — has a right to make upon it. But I am quite as strenuous in believing that great injustice is being done to the public, in refusing to add to the secondary school such instruction as shall make it adequate to provide for other necessities which are equally, if not still more, urgent. I cannot avoid the conviction that very large numbers of young persons are really

debarred from obtaining any benefit from the secondary schools because of the limitations imposed upon their curricula.

Let me instance the Milwaukee High School as an example of Western cities generally. I refer to the Western schools because I can speak of them with certainty. Out of the classes which enter, not more than fifteen per cent finish the course; and of this small percentage of graduates the majority go to the normal school to become teachers. Nearly one half the class leaves at the end of the first year. We shall not have to go far to find an explanation for these facts. The parents soon discover that the education which their children are getting is not going to be of much practical account to them in the business of life, and so the pupils are withdrawn and placed at work. It must not be forgotten that by far the larger proportion of these young people are intended for industrial pursuits. The professions get but few of them. It is facts of this kind, aside from any theoretical views I may entertain on the subject, that have brought me to the conclusion that secondary schools, as now organized, do not come up to the public demands. I have an impression that such changes in them could be effected as would render the figures just given impossible. I am not prepared to say how these modifications should be made; whether the manual training school should be made a separate institution, or the entire secondary system of instruction should be so changed that both kinds of training, the classical and the industrial, could be carried on in parallel lines in the same school. It is understood, of course, by every one that literary instruction is an essential part of the manual training school. All that is meant by such a school is the addition of a sufficient amount of work in the handling of tools and the manipulation of materials, to a good, sound education in language, mathematics, history, science, and drawing. I do not see that the language study need necessarily be confined to English. German or French might be added, with profit to the pupils. But while speaking in this qualified manner of the *modus operandi* of manual training as a part of secondary education, I have not the slightest doubt of its practicability. The success of the St. Louis school has settled the question as to the existence of a public demand for education of this kind, and we may safely trust to the future for the reconcilement of its claims with those of the old system. [Applause.]

I feel, ladies and gentlemen, that I have already detained you too long, but I cannot sit down without adding a word concerning the proper sphere of the manual training school. It does not mean the fitting of pupils for special industrial occupations. Boston, Philadelphia, New York may find it to their advantage to establish schools for the training of artisans, just as they have schools for the training of engineers and lawyers and doctors; but the moment the manual training school undertakes to do this, it will forfeit its place as a part of the general educational system. The establishment of trades schools is a different ques-

tion altogether. Manual training, as I understand it, aims at general results. Its purpose is, as has been shown in the paper, to develop human beings on the executive side of their nature as well as the receptive. Its aim is to so equip a boy that when he gets into the world he will be able to *do* as well as to *think*. [Applause.] The training is to be so generalized in character that it will prove an accomplishment which will stand its possessor in good stead wherever manual skill can be made available. Cannot this be done? Before leaving home, I listened to a lecture in which it was contended that this general training in handcraft is impossible. It was said, for example, that there are a great many different kinds of hammering in the various trades, and that a boy could not learn hammering in such a generalized form as would be helpful to him in taking up some one of these special kinds. This statement will seem rather discouraging when I tell you that it was made by a professor in an industrial university. He ought to know more about such a matter than a layman like myself; but, with all due respect for his knowledge and position, I beg to differ from him. Common-sense teaches that a boy who has learned the nature and use of the simple tools, not as implements in specific trades, but as instruments for shaping the staple materials of industrial processes, will possess a power of adaptation in many directions of work, and will be able to enter very considerably in advance upon any mechanical occupation to which he may turn his attention. Now that the apprenticeship system seems to be falling into decay, the latter consideration is one deserving the serious thought of those who are interested in economic problems.

You will have noticed that in what I have said of manual training, reference has chiefly been made to its industrial relations. This course has been pursued, not because I think it does not produce valuable results in the culture of a human being, considered as consisting of body as well as spirit, but because I am persuaded it must be honestly followed up on this line by those who are in earnest in dealing with the question at all. We cannot get away from the fact which has been so strongly emphasized in the paper, that, at the present time, industrialism monopolizes the lives of by far the larger number of men in every civilized community. It is an imperative duty, therefore, to make the public education conform to this fact. I feel how very imperfectly I have been able to express myself on this most momentous question. But the conviction grows upon me every day that it must be squarely met by the educators of this country, and that it will have to be settled in the interest of the millions of men and women whose happiness should be a paramount consideration in our social arrangements. The intelligence of the masses is the absolute condition of our political security; and the more completely we can make the schools minister to their practical needs, the more certain will be the assurance of peace and prosperity for the whole people. [Applause.]

THE PRESIDENT. — As we have heard an excellent address from the West, let us turn back to New England again, and I will now call upon Dr. Larkin Dunton of Boston.

REMARKS OF DR. DUNTON.

MR. PRESIDENT: I will try to confine my remarks to one practical point, upon which I ought to know something, and, by omitting other points, to keep within the five minutes that you have allowed me.

I think our educational system and our educational practice in this country are not quite perfect; and it seems to me that I see one of the reasons for this imperfection, namely, a change in the condition of a large number of the people.

Years ago, among the inhabitants of New England, and even among those living beyond New England, it was true that they knew nature as we do not know nature to-day. I have in mind now a country boy. When he had come to be fourteen or fifteen years of age, he had a knowledge of animals that was quite extensive. Those of you who have been farmer boys, and are not too old to remember when you were young, will call up a long list of domestic animals that the farmer boy became thoroughly acquainted with, both in their habits and their uses. He also became acquainted with a large class of wild animals. He knew where they lived, and how they lived, and how they died; and of what use they were, either living or dead.

He became familiar, too, with a wide range of plant life. Wheat, rye, oats, pease, beans, and barley, all the domestic plants, he knew thoroughly. Their habits, their mode of growth, their cultivation, their uses, all were made familiar to him by long association and observation. And then there were the wild plants, — the old forest trees, the shrubs, the berries, the grasses, the weeds, the flowers, from the giant oak to the lily of the valley. All these he knew by heart. They were his daily companions from infancy. He knew them from the sprouting seed to the maturing fruit.

He also was a practical student of mineralogy. His knowledge was not limited to single dainty specimens and names of Greek extraction; for he had moved minerals by the cart-load till his fingers bled from handling them; and for years had toiled up and down mountains of slate, and quartz, and granite.

In all this, he frequently lacked what the modern city boy possesses,— a knowledge of scientific names; but he had what I think is better than that, — a knowledge of *the things* themselves.

There is another respect in which the boy of early times differed from the modern city boy. He was a worker. Many of the young men of early New England, before they settled down in life, had made their own

houses and their own barns, and also the ploughs and scythes, — all but the iron work, — the rakes, forks, carts, sleds, harrows, yokes, baskets, tubs, and all the rest of the tools with which they worked their farms. All these had not only been observed by them, but had actually been constructed with their own hands; and more than this, every one of these tools the farmer boy knew how to use, — many of them to his sorrow, but all of them to his profit in education.

But the introduction of steam and machinery has wrought a great change in the habits of the people, — a change affecting not only the manufacturing and commercial interests of the country, but the farming operations as well. Steam does the work now that men did before. But I leave it to your imaginations to trace out the changes in detail, because I must keep within the five minutes assigned me. As a result of this change, there has been of late years a great aggregation of people into the cities. And what has resulted from this? The whole vast field of observation, invention, and of practical working has been taken away from most of the boys of to-day; or, to put it in another way, the boys by being brought to the cities are removed from the proper field for knowing nature at first hand, and, more than this, the powers of their minds are dissipated to an extent that was not possible in the case of the country boy. Think of a country boy working for ten consecutive days in a single field, where he studied nothing but the habits and culture of corn from morning to night; and then contrast him, in imagination, with the city boy, who meets with ten thousand objects of an artificial character every day of his life. Think what power of concentration is developed in the one case, and what mental dissipation results in the other. This accounts for that lack of real manly vigor and mental patience, so conspicuously wanting in the case of so many boys brought up in the city, and for the superior pluck and endurance of the country boy. I was forcibly struck, a short time ago, on learning that of about fifty principals of the Boston public schools, not one was born in Boston. In the case of lawyers the comparison between country bred and city bred would not be so strongly in favor of the country; but still an alarmingly large part of the best lawyers are from the country. The same is true of physicians, clergymen, merchants, and all other classes of men who lead public opinion and direct the commercial and mechanical industries of our great cities.

Now it seems to me clear that the changed conditions of life to which the boys of the present generation are subjected demand changes in our mode of education. I have only time to indicate in a general way what the nature of these changes should be. In the first place, as far as possible, we should create in the city the conditions under which the city boy will be able to make the same observations of nature as those which have given the country boy his advantage in the race of life; make possible the study of animals, plants, and minerals in the city schools. Either bring the country to the city, or carry the city to the country. In the

second place, we ought to create conditions such that the city boy will learn to do something, to devise something, to make something. It is not enough to observe something, and think about something, that somebody, at some time, for some purpose, has made for somebody else; but every boy and every girl ought to be so trained that, in addition to his purely intellectual education, he shall be able to produce something of value to himself and others. These two thoughts, it seems to me, indicate the directions in which our city education needs to be modified in order to be adapted to the changed conditions of modern life. In a word, we ought to so change or enlarge our educational practice as to produce not only efficient thinkers, but efficient doers of good work.

THE PRESIDENT. — This is a subject on which there is a great deal more to be said; let us turn again to the West. We have present with us a representative of Washington University, St. Louis, Prof. C. M. Woodward, whom I will next call upon.

REMARKS OF PROF. WOODWARD.

The Chairman speaks truly when he says that there is a great deal more to be said. It is dangerous for me to get on my feet when this subject is before the house. I have a great deal to say this afternoon, and yet there are one or two things I would like to say now.

Nothing could be more *apropos* than the remarks made upon this subject this morning. In what I shall say this afternoon, I shall endeavor, to the best of my ability, to answer the important questions so clearly and forcibly raised by the last speakers.

One thing upon which I wish to touch is the question of inventions. A speaker last evening referred to the large number of inventions that came from the Eastern States and States where there is a great deal of public education. Now, the statement is undoubtedly true; and yet these inventions do not come from the highly educated, but from those who have had just an elementary education; and they do not come particularly in consequence of that education, — they come without it. These inventors are able to express themselves in words by means of their education; but the inventions are very largely from those whose education has been limited to the very elements; and the powers which these men develop in and by themselves, which enabled them to make these inventions, are the very ones you do not foster in the schools. You do not foster the very things that people must learn before they can make wise inventions. A person who is a fine scholar makes useless inventions, — wastes his energies upon impracticable devices that come to nought. It is the man who begins at the bottom, and begins from the material side, who makes an invention which the world profits by. Now, I am a great advocate of all kinds of education, — of the education of the head and of the hand. I believe in

literature and in art; but I believe also in the practical side of education. Now, when, in justification of our system of education and of the money we spend upon it, we appeal to our applied science and manufactures all over this country, we appeal to the very thing that we do not particularly cultivate. It is a sort of inconsequent relationship, — a *non sequitur*. I say, "Face your education about a little; or, better yet, build on a new face which shall look in that practical direction, and let the old one stand." What we now have is all very well, as Mr. MacAlister has said; all there is in literature is good. I have not one word to say against it. I only do claim equal consideration for some other things.

Another point is, the growth of the mind while the hands are being cultivated. I have some practical observations to make upon that. Students under my charge, who are about of a rank with those in a high school, have been at work with their hands daily. I shall give their programme fully this afternoon. I have time now only to say this: that the growth of their minds is none the less, their growth in literature and mathematics is none the less, because they spend two hours a day in learning the use of tools and the conditions of materials. We don't lose anything on that side, because we incorporate the other.

After two hours of tool instruction and manual exercise in the shop, and one hour in drawing, our boys devote four and one half hours per day to purely intellectual work. This includes two hours of study at home. Their studies are mathematics, language, literature, science, and history. Four and one half hours per day are enough for high-school pupils to give to study and recitation. Increase of time does not carry increase of growth and development. The moment the brain wearies and the attention flags, that moment there should be intellectual change and rest. Crowd the mind an hour longer and you gain nothing worth having. On the contrary, the tired pupil loses his relish, and wearily longs for relief. Our programme preserves a proper balance and variety of work. Our pupils are unusually cheerful and interested. Their intellectual discipline and culture is like their manual, broad, symmetrical, and healthy.

A word on another point. Mr. MacAlister spoke of pupils who have a very short course at school. Now, a great many boys in my school would not be at school at all if it were not for the peculiar features they find there. When my school was opened they were intending to leave school. They had finished their education in the grammar schools, and were going to work; but when they saw the course laid down in manual training at my school, they said, "We will go to that school one, two, or three years." And they will in the end gain time by it in their trades. They still go on with their history and algebra and drawing and literature, and all they get in that direction, as well as on the mechanical side, is just so much added to their education. They would have got nothing beyond the grammar school if it had not been for the manual training school.

Another thing. We have been told that the Boston boys who write good compositions expect to be professional men, clerks, book-keepers, etc. Now, I happened to take account of stock the other day in my school, to learn what the boys proposed to do. Now, remember they had *not* been neglecting their literature, — that was the only study I personally taught in the school. I did it in order to emphasize that branch. My boys testified as to what they were going to do in somewhat the same way as they did in Boston. About half of them said they were going to be machinists and engineers.

The methods by which we approach mechanical pursuits and occupations are such that they deeply interest a bright and healthy boy, and the cultivation of *intelligent* workmanship throws a charm about industrial processes which is largely smothered in an ordinary school. It never seems to enter the heads of these innocent boys who delight equally in geometry and blacksmithing, in draughting and in the "Deserted Village," that a foot-rule is not as honorable as a yard-stick, and that the position of a master mechanic is not as high-toned as that of a book-keeper.

THE PRESIDENT. — Turning again to the East, I call next upon Charles C. Coffin, Esq., of Boston.

REMARKS OF MR. COFFIN.

If we go back fifty years, Mr. President, we find that an entirely new civilization has come to this country, — a civilization based upon the employment of the energy of nature for the benefit of the human race. In 1832 what did the world know of the laws of force? It was not until 1847 that Jules' great law was proclaimed. The inventor, up to that time, was nothing but an experimenter. Peter Cooper, when he constructed his first little engine to run on a railroad out of Baltimore, was wholly an experimenter. George Stephenson in England was wholly an experimenter. There was not a machinist, from that time up to 1850, when Jules' law became known, — not a machinist in the world, — but was an experimenter. When you take the industrial progress of the world into account, whether in England or the United States, or in any other country, it has all been based upon the civilization that has come in with the introduction of steam and the use of the forces of nature for the benefit of the human race.

Now it is all very delightful to go back to Plato and Aristotle. The world needs them to-day, as it has needed them in all the past. But the world needs to-day, as it never has needed before, the principles which underlie all human progress and which the Almighty has given to us in the forces of nature. And therefore when we come down to this question of industrial training and manual labor schools, the training of the hand, the training of the eye, the training of the intellect in connection with them, you come to what lies at the base of all the progress of this country, especially in the future.

I have spoken of the use of the energy of nature. Now the question has been raised here, or it has been alluded to, and the question has been brought into some of the schools as to "what is my education fitting me for"? A question raised, I think, by the Boston *Herald*. Now what do the boys in the schools of this country know to-day as to what they are to do? I was delighted to hear the last speaker say that a large number of boys in his school were to be engineers. The time has come when the great pecuniary prizes of life do not lie in the liberal professions, but they lie in the mechanic arts. You go down to the works of the Pennsylvania Railroad Company, and you will find there masters of machinery receiving a salary of $20,000 a year; on the Union Pacific Railroad, $15,000 a year. The great corporations are ready to pay the largest sum a man will ask if he will render them the services they want. I was conversing with a manufacturer in Lawrence, Mass., a gentleman who is engaged in the dye-works connected with one of the great manufacturing corporations there, who receives a salary of $10,000 a year simply for studying the qualities and uses of dye stuffs. Therefore I say that the great prizes of the future lie in the training of these boys for mechanical pursuits, and not only of the boys but of the girls also in the same line; and it gives me pleasure to stand here and say that the valedictory at the Institute of Technology at Boston, a few days ago, was taken by a young lady, and to give you the words of Mr. Edward Atkinson, "The thesis which she gave on the chemistry of the cotton plant has alone secured her fortune." It gives me pleasure to mention this, in connection with the question you had up yesterday in regard to the higher education of woman, that that young lady, twenty-four years of age, has gone through the entire course of the Institute of Technology, and has paid her board bills and other expenses all the time and taken the valedictory. I am very happy to say that she is my own niece.

So when you come down to this great question and take in all its points, that the civilization of to-day is based upon the employment of the energy of nature, you get at the root of all of the education for the masses, that for the future, you must train them to come in contact with this energy of nature. I will not undertake here to say how that shall be done; but it seems to me that it cannot be done in the high schools, but that you must have special schools. You must begin down at the lowest school, and train them up to the grammar school, and then come to the branch industrial school and complete their education in that line.

THE PRESIDENT. — We will now invite Dr. E. E. White, of Purdue University, of Indiana, to speak to us for a few minutes.

REMARKS OF DR. E. E. WHITE.

It is a matter of no concern to this audience what my official position may be, but that I may not be misunderstood in what I am about to say,

it seems proper to state that I stand at the head of a college of science and industry, with its three great departments of agriculture, industrial art, and mechanics, — the last leading to mechanical and civil engineering. My life work being in the direction of industrial education, there is certainly nothing in my position that would lead me to antagonize the paper that has been read or the remarks that have been made.

But when I entered upon the work of technical and scientific education, I covenanted with myself that, in its advocacy, I would never undermine the great system of public education in the United States; that I would not advocate industrial training by undermining public confidence in the practical value of our school work. In this spirit I rise this morning to discuss this paper.

I do not take the least exception to what has been urged respecting the importance of putting into our public schools so much of manual training, or, speaking more properly, so much of hand training and eye training as will be a valuable element of general education.

I am not prepared to accept the fourth recommendation of the gentleman who prepared the paper, — the introduction of training in the use of tools into the public schools; but of course I take no exception to all that may be said in favor of technical and industrial schools standing beside the public schools and giving to our youth technical and special training for industrial pursuits. This is what we must do in this country. We must have a system of technical training; and the only question is, shall we put it into the public schools as they are now organized?

It seems to me that the able paper which was read at the opening of this discussion is based on a philosophy that is destructive to public education in the United States. Now, that is a pretty bold statement; but let me say, my friends, that if you accept the doctrine that the public school should cover the whole domain of education, I do not see as you have anything to do when Richard Grant White attacks your public schools but to surrender, and surrender unconditionally. This doctrine saps the very foundation of the public-school system, puts a magazine under it, and then lays a train out to fire it. The educator who does that cannot blame the outsider if he fires that train, and the public-school system, in some of its important departments, is blown up before his eyes. He need not be startled at such a result, for he put the magazine under it.

The whole argument of the paper, if I understand it, proceeds upon the supposition that the school is the only agency for the education of a human being, and that the public school is the only school that has been provided, or ought to be provided, to do this comprehensive work. It starts with the human brain, and holds the public school responsible for the complete education of that organ, taking it from a material standpoint, and the development of the body from the cradle to the end. No one, it seems to me, can fail to recognize that there are at least four great agencies for the education of a human being provided by the Creator,

and as universal in their application as the human race. Right beside that child in the cradle stand the father and the mother, God's vicegerents upon earth, if I may use a strong expression, for the proper training of that child ; and the first years of that child's life, in which the important work of education is done, are spent in the family, and the work of education there begun is only continued in the public schools, — and that, too, much narrower than the family gave it.

Over against that cradle also stands the social community in which that child is born, who are also, under God, responsible in a measure for its education and development; and there comes to its life in every direction — in work, in play, in social contact with other children, in all the relations of social life — vital and most valuable education and training. There also stands by that cradle the church, ordained of God for the education and salvation of the human soul. First through the father and the mother, and then through other agencies, it breathes into its life constantly those influences that shape and enrich it. The state also stands by that cradle, clothed with plenary power to see that nothing subverts that child's birthright, — the right to be unfolded, instructed, educated.

Now to hold the public school, which is the state's agency for the education of that child, responsible for all the neglect and all the defects of these other educational agencies is simply to hold the public school responsible for that which it cannot do. Whenever it is conceded that the public school is responsible for the entire work of education, you cannot defend it : there is nothing to be done but to surrender.

Any advocacy, then, of industrial training that ignores these other agencies for the education of a child, and any theory that puts the public school to the task of covering the entire province of education, will make it defenceless against hostile criticism.

There is another fallacy in the paper, which seems to me to be fundamental, to wit, that the true end to be kept in view by the teacher in the training of a child in the public school, — for I take it the paper was confined to public education, if not I am talking all at random, — is to prepare it for manual labor; that the aim of the public teacher is to prepare the child TO DO something in life, to work with its hands and earn its bread and clothing, to build houses and carry on other industrial pursuits; in other words, that the leading purpose of the teacher, in his sublime office, is to prepare the child for what is called the *work* of life.

Now, Aristotle never committed that blunder. But that grand philosopher put before us as the aim of every educational process the development and culture of the human soul. His philosophy put man above his work; it made man the supreme end, the human soul and its culture the sublime purpose of general education.

No one holds that education should lose sight of the fact that man is to work. The family has not lost sight of that; the social community has not lost sight of it; and the teacher must not lose sight of it.

But whenever in public education manhood is subordinated to the trades and occupations of life, the highest purpose and end of education is subordinated to that which is lowest. The idea that "the children of labor are to be educated *for labor*," which was quoted in the paper, is a doctrine which every American should be slow to accept. That will do for Europe; but let us be very careful how we copy our educational methods from Europe. In Europe the child of labor is looked upon as the drudge of society, as the tool or machine which the upper classes are to use to contribute to their own good, — and republican France has not yet risen above this idea, — and hence, of course, they educate the child of labor with sole reference to making him a good workman, never realizing that the child of labor is to be a man and a citizen.

No philosophy of education is true that does not recognize the fact that every human being, — whether he is to work in the shop or stand in legislative assemblies, — has as his supreme birthright the right to be unfolded, enriched, and developed as a man. Any theory of education that ignores that fact is fundamentally un-American, and contrary to all our national ideas. We have, thank God, no caste in this country, and the children of our schools may rise or fall according to their power and merit, just as drops of water of unequal temperature can glide by each other, ascending or descending. American society is not yet classified "horizontally," and while we may educate a child incidentally for labor, let us ever remember that the supreme end for what we educate that child is that he may be a *man*. [Applause.]

I have spoken thus strongly, if possible to induce all who are advocating industrial education to change their base, and put their arguments and their demands on grounds that leave our public-school system in public confidence and in public esteem. If the work which we have been doing in this country for two hundred years has not made better workmen, better artisans, and better inventors; if it has not contributed to all the interests of society, productive, distributive, governmental, or educative, — if it has not done this and done it practically, then let me say that all such devices as putting in a little training in the use of tools into the public schools will never change the condition of things. You have got to rely in the end on this fundamental general training furnished by the public school in its present office and function. You may modify and improve the system; but if it is to be assailed and undermined, the next step in the argument is this, "If this education is so largely a failure, you have no right to tax me to support it." But the public school is not a failure. Look over your list of inventions and inventors in New England. How many technical schools has New England had, how many industrial schools, out of which these inventors have come? Very few. They have come out of the common schools of New England, out of her colleges, that have developed thought and brain power; out of these have come these inventors, that are touching the earth and making it

glad. It is this that is the source of industrial power. The truth is that the most practical result of education is thought. This is the alchemy that is turning everything it touches in this land into gold. Thought in the brain of labor is the one condition on which American industry can rest. [Applause.]

REMARKS OF DR. LARKIN DUNTON.

I want to say just one word here. It seems to me that there is one fallacy underlying the remarks of the gentleman who has just spoken, and that is the assumption that it is not necessary for children to be fed and clothed in order for them to grow to be men. Now I hold it to be a fundamental law, that before you can be a man and be useful to other men, you must have the means of living. Hence I say that any system of education which does not fit our children to earn their bread and butter and clothing does not do the work that we have a right to demand of our public-school system.

REMARKS OF MR. A. P. MARBLE, SUPERINTENDENT OF SCHOOLS OF WORCESTER.

After the most excellent paper that was read, propped up by several excellent addresses, all on one side, I began to think it was time for me to be heard. I was going to interrupt the proceedings, when I found my friend Dr. White was on the same side with me.

Now I think there is a fallacy which underlies the position of the last speaker. His fallacy is in assuming that Dr. White's position does not prepare a boy for earning his living. He begs the question when he says that this boy must earn his living, and therefore he must have industrial training of an educational form. I say the boy must have his living; therefore he must have industrial education in some other form. The course of the discussion made me think of the revival meetings where it always seemed to me that one side always had its own way, and nobody could speak on the other side, — the Devil never could have a fair chance. I don't claim to be his representative here; but if you read "Paradise Lost," you find some things about him, as he is represented there, which cannot but be admired. We industrial-education people come together here, and we resolve, as a certain religious assemby once did, first, that the earth is the Lord's; secondly, that the Lord has given it to his saints; and thirdly, that we are the saints. That is about the position that the industrial-education people take here. We school-teachers come here and say that we are "educato-r-r-s," — spelled with two "r's," rolled under the tongue, — and we assume everything whatever on earth in regard to the bringing up of a child. We have our kindergartens, and we want to take the baby before he has done nursing. Then we have our social scientists, who want to reform and reconstruct society from the very foundation. Then we want all the mechanical arts brought in, and the school made

responsible for the whole thing, and we, "the saints," are going to monopolize and manipulate this whole creation of God and be responsible for man here and hereafter. It seems to me that it is time to confine ourselves to our constitution, and recognize what Dr. White has so well said, that there are other institutions engaged in the work of education, besides ours; to recognize the fact that the mother is the best kindergarten that ever was, and was made for that very purpose, and that when you educate her into something else, so that there are no mothers then our work will be done. It is a short solution of the whole problem. I was talking with a friend, the other day, in regard to the matter of conferring degrees upon women as well as men, — Bachelors and "Maidens" of Arts, etc., — and he proposed a solution of the degree question, which seemed to me very good; and as he is a bashful man and will not say it himself, I want to put it in here on this branch of the question, — that if we give Bachelor's degrees to men and confer Doctor's degrees and Master's degrees upon those who have distinguished themselves in the line for which they are best fitted, that above all, the mother of the Master or the Doctor should have a degree for being the mother and the trainer of a great man or woman.

Now it seems to me that we have a school for the purpose of training the minds of the young, and that it is wholly fallacious, — I agree with everything that has been said here, in a modified, homœopathical form, — that it is wholly fallacious to talk about educating the hand. My hand is as good as anybody's hand, — and is better for me. I don't believe that hand can be educated. It is *mind* that is educated. If the mind were educated in the right direction, the hand would play the violin or organ, or paint or draw. Of course, we have got to train the mind through the hand. When we talk about "object teaching," "industrial training," we think we are training these bodies. Where will these bodies be one hundred years hence? They will not be anywhere. We are in reality training the mind. Now the schools we have to conduct are to train boys and girls in those directions that are common to everybody, and one of the things that the boys and girls ought to learn in those schools is how to get information from books. There is no information stored up in the plough, hoe-handle, steam-engine; but there *is* information stored up in books. If a boy is prepared to get information from books, he can make indefinite progress. If you take out of his hand the books and put in there the hand-saw and the hammer, and ask the teacher — who is most likely a young girl — to teach them, when she does not know anything about them, the whole matter will simply become "a bore" to all parties concerned. The saw is brought into the recitation-room, and the teacher says, "Now saw." It is a thing that does not belong to the school at all. It belongs outside, and ought to be attended to outside.

REMARKS OF DR. J. W. HOOSE.

I think that Dr. White's position is subject to query from this standpoint. His idea that the schools can do only such and such things assumes that society is controlled by one of the institutions which it has created, which is fallacious. Society has the right, the inalienable right, to create institutions for such purposes as shall serve its interests. Therefore, if the state sees it for its advantage to institute schools, of whatever character, it has the right to do so.

DR. WHITE. — The gentleman either misunderstood me, or I lacked clearness in my statement. No one questions the general proposition which the gentleman enunciates; and, if he will read the report made by me two years ago before the National Educational Association (since printed by the Bureau of Education), he will see that the doctrine is therein stated that the public school exhausts neither the right nor the duty of the state in education, and that the state has clearly the power to provide for industrial training so far as this may be necessary. Shall technical training be provided in the public schools? This is the question. It is conceded that there is a place in the public school for whatever industrial training is in harmony with its true function, — *general education*. The public school cannot be held responsible for the whole domain of education.

At this point several persons rose to speak. The discussion, however, had greatly exceeded the time allotted to the subject, and its further consideration was postponed until the afternoon. The afternoon session being also overcrowded, there was no opportunity to bring the subject up again, and, as Mr. Clark was by courtesy entitled to close the discussion, he was given permission to do so in print.

Mr. Clark's closing remarks would have been as follows: —

After what has been said by Mr. MacAlister, Dr. Dunton, and Prof. Woodward, there is little need of further remark on the educational side of the question; but industrial education has such an important bearing on the still broader question of social order, that its claims as a fundamental social question cannot be ignored.

If you will lift your eyes for a moment from the consideration of purely pedagogical details to the intense human life that is surging about the very thresholds of your schools, you will see at this moment an insurrection of labor at our great industrial centres, which threatens such serious social dangers as should cause every citizen to gravely consider the responsibilities committed to his charge. Let us try to comprehend the full sig-

nificance of this insurrection* by broadly measuring its present and its possible development in the near future.

There are, at present, in our Northern States, at least two million laborers in full sympathy with this movement, and it is safe to say that within the next generation their numbers will be more than doubled, with means for social insurrection greatly increased and perfected. Look a moment at two ideas infolded in this movement, — no right to private property, no freedom to exchange labor; two ideas directly opposed to individual well-being, the basis upon which our present social order rests. No one can survey the social condition of this people at the present time, noting the important place held by our industrial population in the social organism, and observing the social ideas they hold, without perceiving that we have, within the very vitals of the organism itself, a foe which may become more dangerous to our institutions than any born of the slave power. I cannot enlarge on this topic now; but the conflict between capital and labor, that lies just before us, is one that will test our form of government to its uttermost powers, and I feel that the consideration of labor in its social and moral aspects should be a matter of the deepest concern to all who have to do with public education.

With this dire conflict before us, can we afford to ignore the influence of the public school as a means for disseminating correct ideas in regard to labor, its rights, its duties, its power? The proper presentation of the question of labor to the rising generation is one of the fundamental questions connected with public education at the present time; and yet this is the one question which educators seem to ignore. In one of the preliminary meetings of this convention which I was permitted to attend, a discussion took place on the relation of the high school to business life; and the ideas of business life presented related entirely to the mercantile, exchange, or professional pursuits; not a hint was given that our industrial requirements were within the purview of high-school instruction, or that thought in the labor of the hand was in any sense an educational or a business question.

In the paper read this morning, four points were particularly emphasized: —

First. We have entered upon a period of social development which recognizes individual man — in his freedom to think, freedom to labor, and freedom to exchange labor — as the basis of all social order, and under these circumstances individuals are freely ranging themselves in certain lines of employment, each of which contributes to the well-being of the social organism.

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* Reference is here made to the labor disturbances that were then rife at Pittsburg, Cleveland, Cincinnati, Chicago, Milwaukee, and other cities, with over 200,000 operatives on strike.

Second. These employments require the exercise of trained thought, expressed both by language and by the hand in skilled labor; and its expression by the skilled hand is as fundamentally necessary to the best interests of the organism as its expression by language.

Third. Our educational training should be broad enough to give our youth a mental training of equal value in both the language and labor employments.

Fourth. Our present education is defective, because it exalts the expression of thought by language, and ignores its expression by the skilled hand.

I do not see that any one has endeavored to controvert these points. Dr. White, it is true, charges me with laying a mine for blowing up our whole public-school system; yet, if I understand him correctly, he also maintains that thought in labor is essential to our social well-being: indeed, he says that thought in labor is "the alchemy that is turning everything it touches in this land into gold." How he would secure this development of thought in labor without proper instruction in natural science, and without any educational training of the hand in skill, I am unable to see. Special schools for artisans or mechanics cannot be supported at the public charge, and giving a youth knowledge which fits him for a clerk or book-keeper is not the way to prepare him for an industrial employment, unless it be on the Irishman's plan of getting his pig to Cork, by heading him in the opposite direction. Technical schools and universities, like those now existing in various parts of the country, give educational training to but few youth comparatively, and these are the directive minds; consequently these institutions cannot possibly reach the great mass of our future industrial workers. Unless, therefore, we can by some means secure proper industrial training in connection with our public schools, we shall leave our industrial classes wholly unprovided for in a fundamental feature in their practical education; and our school system will continue to be open, as it is now open, to the charge of giving a class education, of favoring those who are to enter the distributive and the professional employments.

I know I am not arguing the question now on the ground of broad, general culture. That ground has been already covered in this discussion. I wish here to defend the question on the social side, on the practical side; and in these respects the advocates of industrial education propose something for decidedly strengthening the public-school system of the country. I am far from believing that by bringing the instruction in the schools more into harmony with the needs of our laboring population their usefulness will be in any way jeopardized. Who should be the best friends of the schools? To whom should we look for an unflinching support of them? To those who have the most need of them. Yet the figures Mr. MacAlister gave us this morning show only too clearly that

the class that ought to feel the greatest interest in our schools are quite indifferent towards them. And this is not all. We have to observe that in almost every city when the interests of the schools come up for consideration, — particularly the high schools, — two classes are usually in opposition: the laboring class, with their children in the primary schools only; and the wealthy, tax-paying class, with their children in private schools. This should not be; and, if I may be permitted to make a suggestion, I should say to you, as educators, that you could not take a wiser step than to attach heartily to your public schools the great mass of the working population of this country. Let these people see by your educational provisions that it is not the purpose of the schools to give a literary training merely for the benefit of clerks, merchants, book-keepers, etc., but that, combined with this literary training, going hand in hand with it, are generous provisions for industrial training, provisions for expressing thought in labor. Let them behold their children coming out of your schools possessed of skilful fingers and a love for work, as well as nimble brains, prepared to become wage earners with tools, as well as with the pen, and you will have secured for your schools a support that cannot be overthrown, — a support that will aid you in all reasonable demands for a higher and a better intellectual culture for all classes. In the presence of this vast labor insurrection now spreading over the country, it is not creditable to our public schools that they are virtually ignored as a remedial agency by both parties to the controversy. The public school should be society's strongest bulwark against all social heresies. It should be, in fact, the means of clarifying, as it were, the minds of future citizens into a respect for law and order.

In conclusion, I wish to disclaim all idea of class education in our schools. It is to break up the class education of the past and the present that industrial education is now urged. We owe it to those of our citizens who are to live by industrial labor, that they shall be as well considered in our educational provisions as those who are engaged in trade; and above all, it should be one of the primal functions of the school to teach the true nobility of citizenship through labor, so that every workman acquainted only with toil, crowded down in the struggle for existence by the stern competition between machinery and the unskilled work of the human hand, can believe, as he looks into the faces of his children, that the public school is the means by which they can be lifted to better conditions than he has known.

I do not believe, therefore, that the effort to bring our public education more into harmony with the social demands of our time threatens in any way its existence or its usefulness. I do not believe that the system is endangered by honest efforts to make it better; and those who charge upon the advocates of industrial education an effort to pervert the underlying features of our public-school system, entirely misapprehend the movement, as well as the social conditions out of which it has sprung.

MANUAL EDUCATION

A FEATURE IN

PUBLIC EDUCATION.

A PAPER

READ BEFORE

THE NATIONAL TEACHERS' ASSOCIATION,

SARATOGA, JULY 13, 1882.

By PROF. C. M. WOODWARD, PH. D.,

OF WASHINGTON UNIVERSITY, ST. LOUIS.

MANUAL EDUCATION

A FEATURE IN

PUBLIC EDUCATION.

By Prof. C. M. Woodward, Ph. D., *Washington University, St. Louis.*

With his gentle lance, Emerson pricked many a bubble, and though collapse did not always follow immediately, the wound was always fatal. In 1844, in his essay on New England reformers, he charged popular education with a want of truth and nature. He complained that an education to *things* was not given. Said he: "We are students of words; we are shut up in schools and colleges and recitation-rooms for ten or fifteen years, and come out at last with a bag of wind, a memory of words, and do not know a thing. We cannot use our hands or our legs, or our eyes or our arms." And again, speaking of the exclusive devotion of the schools to Latin, Greek, and mathematics, "which, by a wonderful drowsiness of usage," had been "stereotyped education, as the manner of men is," he says: "In a hundred high schools and colleges this warfare against common-sense still goes on. . . . Is it not absurd that the whole liberal talent of this country should be directed in its best years on studies that lead to nothing?"

This is, perhaps, too severe; but we must admit that Emerson anticipated and greatly aided a reform which has been gathering strength for a whole generation. Hence it is to-day scarcely necessary that I should present arguments in favor of manual education. The great tidal wave of conviction is sweeping over our whole land, and the attitude and aspect of men are greatly changed from what they were ten years ago. What I said in 1873, in a public address in favor of technical education, was held to be rank heresy. I fear it would be regarded as rather commonplace to-day. The progressive spirit of the age has actually penetrated our thick hides, and we are trying to keep step with the universe.

To be sure, we still call ourselves reformers, and we shall continue to battle for the new and true till our banners are the only ones flying. But the day of surrender is near at hand. One by one the outposts have fallen into our hands, and only a few citadels remain. An armistice has been asked for, and if we can only arrange satisfactorily the terms of an honorable capitulation, the enemy is willing to march out and join our ranks.

In every community the demands of technical education have been discussed, and in every instance when the old system has been subjected to the tests which good sense applies to business, it has been found wanting.

And yet let me not pass with words of criticism alone. Let us recognize the inestimable value of American public education. With all its faults, it is our best inheritance. Let us be just, yea generous, if need be, to the bridge that has brought us over. Let us say, "God speed your work!" to those who are battling for education in States black with illiteracy, and let us commend the splendid work done by earnest men and women on all sides. But the faults — we must not be blind to them. If the old education has been good, we can make the new better.

DEFECTIVE EDUCATION.

Is, then, I ask, — is the education we give as broad and round and full as it ought to be? Is the time of tutelage most wisely spent? Do the results we secure justify the means and methods we use? Is the relation between education and morality as close as it should be? I think to these questions we must seriously answer, No! There is a lack of harmony between the school-house and the busy world that surrounds it. Some have even claimed that we are wrong in supposing that education always diminishes crime. Let us see if there is any truth in their position.

You know how often a life is a failure from defective education. Too often do we see young people, who might have been educated to eminent usefulness, cast

> "Unfinished into this breathing world scarce half made up."

I have seen poor lawyers, who, under a proper system of training, would have made excellent mechanics, and not a few of highly educated, able-bodied men actually begging for the price of a day's board. I recall one man in particular who was able to speak several languages, but because no one would employ him as a linguist he must needs beg, for he knew not how to work. Now, when a man's education has been misdirected, and he is thrown upon the world shackled by outgrown theories, bewildered by false lights, and altogether unprepared for the work which perhaps he was born to do, and when in his extremity he resorts to knavery and violence and fraud to secure what he knows not how to get by fair means, those who directed, or should have directed, his education cannot be held blameless.

The moral influence of occupation is very great. A sphere of labor, congenial and absorbing, that fully occupies one's thoughts and energies, is a strong safeguard of morality. If you would keep men out of mischief, keep them busy with agreeable work or harmless play. The balance of employments is fixed by our state of society and the grade of our civilization. Now, if indiscriminately we educate all our youth away from certain occupations and into certain others, as is very clearly the case,

some employments will be crowded and consequently degraded; in others, the choicest positions will be filled by foreigners, and the lowest posts, wherein labor is without dignity, must perforce be filled by those who have neither taste nor fitness for their work. The result is broils, plots, and social disorder.

Thirty years ago an eloquent Frenchman, Frederic Bastiat, charged the one-sided education of his countrymen with being an actual danger to society. He argued that the "stranded graduates," as he called those who, unable to navigate the rough waters of practical life, had been tossed high and dry on the reefs along the shore, "filled with a sense that the country which had encouraged them to devote their best years to classic studies owed them a living, or a means of living, would become the leaders of mobs and officers at the barricades."

MORE LIGHT.

When the shadow of death was drawing over the great Goethe, he uttered his last wish for "more light." We must echo his cry, if we would prepare our American system of education for a more glorious destiny. We treat our children too much as the unskilled gardener treats his plants. He puts them by a window and pours over them a flood of light and life-giving rays. Instinctively they turn out towards the source of their strength. They put forth their leaves and budding promises, and as we look at them from the outside, we mark their flourishing aspect and rejoice. But if we look at the other side, we shall find them neglected, deficient, and deformed. What they wanted is more light,— light on the other side. Were the sun always in the east, our trees would all grow like those on the edge of the forest, one-sided.

So in education; we must open new windows, or, rather, we must level with the ground all artificial barriers, and let every luminous characteristic of modern life shine in upon our school-rooms. We must pay less heed to what the world was two or three hundred years ago, and regard with greater respect what the world is to-day. Before we devote ourselves exclusively to the arts of expression, we must cultivate all the faculties and encourage the growth of thoughts worthy of expression.

THE ARTS OF EXPRESSION.

Dr. Youmans recently said (*Popular Science Monthly*, May, 1882): "The human mind is no longer to be cultivated merely by the forms or arts of expression. The husks and shells of expression have had sufficient attention; we have now to deal with the living kernel of truth. . . . Under the old idea of culture, a man may still be grossly ignorant of the things most interesting and now most important to know. . . . Modern knowledge is the highest and most perfected form of knowledge, and it is no longer possible to maintain that it is not also the best knowledge for

that cultivation of mind and character which is the proper (*i. e.*, the highest) object of education."

I desire, for a moment, to direct your attention to the arts of expression. Next in rank to the ability to think deeply and clearly is the power of giving clear and full expression to our thoughts. This last can be done in various ways. As this brings me squarely upon a subject I wish to impress strongly upon you, I will illustrate it by a somewhat elaborate example: —

A gentleman recently called upon me for my opinion concerning a certain automatic brake for freight cars. The device was new to me, but it lay pretty clearly defined in the mind of my visitor. It was not original with him, but for the purposes of my illustration it might have been. Before I could pass judgment, the device must lie clearly in my mind, perhaps more clearly than it did in his; so he set out to express his thought. He was what we call well educated, being a graduate of the oldest university in the land, and was well versed in the conventionalities of spoken and written languages. Accordingly, he proceeded to utter a succession of sounds. His lips opened and shut with great rapidity, and without intermission a series of sounds fell upon my ears. The sounds I heard were quite familiar to me, as I had been listening to them in one order and another for over forty years, and as they had always been associated in my mind with certain concrete things, and the relations of such things to each other, certain thoughts about those things began to take shape in my mind.

Of course, the sounds I heard had not the smallest likeness to the things called up by them in my mind. To an Italian peasant, or to Archimedes of Syracuse, they would have been as unintelligible as the chattering of a magpie. They were purely arbitrary or conventional; yet, much of our education had been devoted to their mastery. Nevertheless, as a means for expressing thought, they were, in the present case, quite inadequate. The ideas aroused in my mind were confused and fragmentary, and altogether unsatisfactory. Had my friend resorted to writing a description of the invention, in either English, French, German, Latin, or Greek, using in every case a set of purely conventional symbols (to represent the other set of conventional sounds), which we had both spent years in getting some knowledge of, he would have succeeded little better. Whether speaking or writing, much of his thought he could not clothe in words. He therefore abandoned the wholly conventional, or verbal, art of expression and turned to the pictorial.

But here he soon confessed that his education was deficient. He had never studied the art of representing objects having three dimensions on a surface having but two, and hence he was ignorant of the methods he ought to adopt to express by drawings the objects he was thinking of. However, I caught more of his meaning from some crude attempts at sketching than I had from all his talk. A few lines were luminous, yet

they left far too much for me to supply by my imagination; hence, my visitor withdrew and sent me a full set of what we call "working drawings," made by the inventor, who was a draughtsman.

These drawings, though having a sort of ocular resemblance to the things signified, were still half conventional, and required, on my part, a certain amount of training to enable me fully to understand them; this, fortunately, I had received, and through the art of expression embodied in them, I gained a tolerably clear idea of the thought of the inventor. With scarce a written or spoken word, they expressed that thought far more clearly and fully than any merely verbal description could do; they showed the relations of parts which were beyond the reach of words.

But my friend was not content to stop there. The drawings had been but partially intelligible to him with their "plans, elevations, and sections," and judging me by himself, he believed that a third art of expression would out-value both the others; he therefore invited me to call at a shop and examine a specimen of the device itself, produced by a skilled mechanic. The *real article*, which is the mechanic's art of expression, proved to be an improvement even upon the thought of the inventor. The latter had not been a mechanic, and he had made the sort of mistakes that draughtsmen, who are not something of mechanics, always make. Certain parts it had been practically impossible to construct, as they involved shapes that could not be moulded by ordinary means. A nut had been placed where it was next to impossible to turn it; and certain parts which were to be of cast-iron had been given such dimensions that the casting would have snapped in pieces while cooling. These errors had been corrected by the mechanic, and the perfected thought lay fully expressed before me.

In this illustration we have three greatly different methods of expressing essentially the same thought. Each constitutes a distinct language, and each is absolutely essential to modern civilization.

You will note how a crude thought often takes practical shape in the hands of the draughtsman and the mechanic. "Drawing," says Prof. Sylvanus P. Thompson, "is the very soul of true technical education, and of exact and intelligent workmanship." Those who have tested this can tell how many marvels of ingenuity, as lovely as a *chateau L'Espagne*, have vanished in the presence of "plans and elevations"; and how many beautifully drawn designs have been mercilessly condemned as impracticable by judges versed in the laws of construction and the strength of materials.

Much more could be said upon the arts of expression, their relative importance and proper cultivation, You will readily think, as did Lessing, in his Laocoon, of poetry, painting, and sculpture. You will recall how lofty thoughts have in all ages found expression in architectural forms; and yet throughout all the history of architecture the laws of mechanics as then understood and the properties of the materials used have deter-

mined the different styles. In our own age we are trying to express ourselves in iron and steel, and to cast off the fetters of an age of marble and granite.

In a recent address, Mr. Charles H. Ham, of Chicago, said that by putting thought into seventy-five cents' worth of ore, it is converted into pallet arbors worth $2,500,000. He continues: "Skilled labor is embodied thought, — thought that houses, feeds, and clothes mankind. The nation that applies to labor the most thought, the most intelligence (*i. e.*, that best expresses its thought in concrete form), will rise highest in the scale of civilization, will gain most in wealth, will most surely survive the shocks of time, will live the longest in history."

But some one will say, as to methods of expression: "One art is enough for me; make me master of one and I will care for no second." I answer, you are thinking of an impossibility. If a mechanic is only a mechanic, he is never a master, even of his own art. He is crippled at every turn; he is limited in expressing himself to what he can make. He is without that powerful ally, — drawing, — the shorthand of the imagination, and in the presence of thoughts that baffle concrete expression he is dumb. Valuable machines even are sometimes purely imaginary. Clerk Maxwell, in his "Theory of Heat," says: "For the purposes of scientific illustration we shall describe the working of an engine of a species entirely imaginary, — one which it is impossible to construct, but very easy to understand," referring to Carnot's engine. In like manner, if one would command confidence as a draughtsman, he must be a mechanic as well. And finally, if I am a student of words alone, and if I go not beyond my dictionaries, I shall never guess their meaning. A large proportion of our emphatic words are technical; they belonged originally to some craft, and none but a craftsman knows their exact meaning. President Eliot of Harvard once said that the highest education was that which gave one the fullest and most accurate use of his mother tongue. I would modify the statement and claim that the highest and most liberal education is that which, beside cultivating most fully the powers of thought, gives one full command of all the arts of expression.

I need not remark that many, perhaps most, thoughts do not admit of concrete nor even of pictorial expression, as, for example, all abstractions; hence they suffer seriously from want of clearness. If you have a clear thought on abstract matters, you can never be sure you have expressed it clearly.

The thought must precede the expression by any method, and in the cultivation of the thinking mind the concrete should precede the abstract. Give children clear and accurate thoughts of real things, of the material world we live in, of real plants and animals, of the laws of materials, of qualities, and then of quantities, before you venture on the field of abstractions. Before you cultivate the high arts, make sure of the low ones; without them as a foundation, no superstructure of fine art can

stand over night. As Emerson says (in "Man the Reformer"): "We must have a basis for our higher accomplishments, our delicate entertainments of poetry and philosophy, in the work of our hands. We must have an antagonism in the tough world for all the variety of our spiritual faculties, *or they will not be born.*"

A habit of clear thinking once formed will never leave us, however abstract our investigations become; while a habit of stopping short with ill-defined results, of resting content with obscure and half-grown mental images, a mental attitude of fogginess, has a stultifying effect which seriously dwarfs the mind. This is the most important subject; but I have place for but a few words of exhortation. Give children clear thoughts and begin with the concrete. When the mind is too weary or too sick to clear up obscurities, it is time to seek rest and recreation and fresh air. Beware of straining the powers of attention by too much schooling; beware of overtaxing the mind by too many and too difficult subjects; and especially beware of poisoning the blood and debilitating the brain by bad air. The fruit of any and all these evils is mental as well as physical decrepitude.

THE AIMS OF EDUCATION.

But to return. I claim for these forms of expression, which I have taken pains to distinguish, more nearly equal care and consideration in the elementary education of every child. Teach language and literature, and mathematics, with a view to make each child a master of the art of verbal expression. Teach mechanical and free drawings with the conventions of shade and color, and aim at a mastery of the art of pictorial expression. And, lastly, teach the cunning fingers the wonderful power and use of tools, and aim at nothing less than a mastery of the fundamental mechanical processes. To do all these things while the mind is gaining strength and clearness and material for thought is the function of a manual training school.

PREJUDICES TO BE OVERCOME.

The traditions are heavily against us, but the traditions of the fathers must yield to the new dispensation. As was to have been expected, the strongest prejudices against this reform exist in old educational centres.

As President Walker, of the New York Board of Education, frankly admitted at the laying of the corner-stone of Prof. Felix Adler's splendid institution, The Workingman's School and Free Kindergarten, the methods and aims proposed by the advocates of manual training schools are a criticism upon the methods and aims of the established system, and nothing is more natural than for it to resent the criticism and discourage the reform.

No man has done more — nay, no man has done as much — to introduce the manual feature into American education as Prof. John D. Runkle of Boston; and yet the School of Mechanic Arts, established by him in connec-

tion with the Massachusetts Institute of Technology has, after an existence of several years, been apparently almost frozen out in the biting atmosphere of that highly æsthetic city. I doubt if one could find on American soil a more unpromising field for a manual training school than beneath the lofty elms of Cambridge and New Haven.

LUXURIES IN EDUCATION.

There are luxuries in education, as in food and dress and equipage, and in wealthy communities the luxuries command the chief attention. At the English universities of Oxford and Cambridge a large proportion of the students expect to be gentlemen of leisure. The idea of giving heed to the demands of skilled labor, of preparing for lives of activity and usefulness, — the idea of earning one's daily bread and of supporting one's family, — scarcely enters their heads. Either they inherit livings, or they seek to get livings through the church, or they enter the army with commissions purchased by kind friends who wish to get them out of the way, or they go into law and politics. It is no wonder that such men devote themselves largely to the luxuries of education, — Higher Mathematics, Astronomy, Greek, Sanscrit, Speculative Philosophy, Latin hexameters, Italian, — in a word, to "polite" learning. In such an atmosphere as that how incongruous is this plea of mine for an education to things; for a training of the hand and eye as well as the intellect to lives of useful employment! Yet half the colleges in the United States ape the English universities, and half the high schools ape the colleges.

The result of all this has been a certain false æstheticism which turns away from the materialism of our new notions. The highly cultivated would soar away into purer air and nobler spheres. There is a feeling, more or less clearly expressed, that the material world is gross and unrefined; that the soiled hands are a reproach; that the garb of a mechanic necessarily clothes a person of sordid tastes and low desires. As Dr. Eliot of St. Louis has expressed it: "It is thought to be a sad descent for a university whose aim should be the highest education to stoop to the recognition of handicrafts of the mechanic."

MANUAL EDUCATION.

Perhaps no better general statement of the new creed has been made than that of Stephen A. Walker, in a speech already referred to. He put it for us thus: "Education of the hand and the eye should go along with, *pari passu*, the education of the mind. We believe in making good workmen as well as in making educated intellects. We think these are things that can be done at the same time, and our proposition is that they can be done better together than separately."

As I said in the beginning, this proposition is meeting with general favor among the people. I have pointed out the sources of some of

the opposition; it remains for me to touch upon the two objections which I surmise are about the only ones in the minds of my hearers. You ask first, "Is your proposition practicable?" You doubt the feasibility of uniting in a real school such incongruous elements as arithmetic and carpentry, history and blacksmithing. You fear either that the shop-work will demoralize the school, or that the shop-work will never rise above the dignity of a mere pastime.

Now I claim not only that what I propose can be done, but that it has been done in St. Louis, and perhaps elsewhere as well.

ORGANIZATION OF A MANUAL TRAINING SCHOOL.

Prof. S. P. Thompson, in his valuable essay on the apprenticeship schools of France, classifies French technical schools under four heads: —

1. The school in the workshop or factory.
2. The workshop in the school.
3. The school and the shop side by side.
4. The half-time schools.

In the first class the school is subordinate to the factory; the boys or girls learn a particular trade, and everything in the school as well as in the shop is designed to meet the wants of those expecting to enter the particular trade. For obvious reasons there can be no general adoption of such a combination in the country. Prof. Thompson gives his verdict in favor of the school and the shop side by side, though there is much to recommend the second plan.

No one of the French plans exactly suits me. I prefer to incorporate manual with intellectual education, and include both under the name school. We don't have what you call school in the morning and shop in the afternoon; nor do we spend the forenoons with tools and devote a few evening hours to study and recitation. We mix up the old and the new in one harmonious plan.

Nothing can show at a glance just how our school is managed as well as our daily programme.

We had last year one hundred boys in two grades of sixty and forty pupils. There were five divisions of twenty each. The disposition of their time between nine and three o'clock is thus shown: —

DAILY PROGRAMME — FIRST TERM. 1881-82.

Classes.	Divisions.	9—11 A. M.			11 A. M.—1 P. M.				1—3 P. M.			
Second Year.	A.	Shop-work. Blacksmithing.			40 min. Algebra.	40 min. Eng. Hist.	20 min. Study.	20 min. Recess.	40 min. Physics.	20 min. Study.	60 min. Drawing.	
	B.	60 min. Drawing.	20 min. Study.	40 min. Algebra.	Shop-work. Blacksmithing.				20 min. Recess.	20 min. Study.	40 min. Physics.	40 min. Eng. Hist.
First Year.	A.	Shop-work. Carpentry.			60 min. Drawing.	20 min. Recess.	40 min. Grammar.		40 min. *Arithmetic.	40 min. Study.	40 min. Physic'l Geog.	
	B.	40 min. Grammar.	20 min. Study.	60 min. Drawing.	Shop-work. Carpentry.				20 min. Recess.	20 min. Study.	40 min. Arith.	40 min. Physical Geog.
	C.	40 min. Arith.	40 min. Study.	40 min. Physical Geog.	40 min. Grammar.	20 min. Recess.	60 min. Drawing.		Shop-work. Carpentry.			

NOTE 1. Penmanship takes the place of physical geography and physics once a week.
NOTE 2. Each class has a music lesson once a week, extending the daily session half an hour.
NOTE 3. Composition takes the place of grammar and history once a week.
NOTE 4. Spelling occupies half the "study" time three times a week.

There is here no confusion, no sense of incongruity. The boys go as soberly to shop as to recitation, though I ought not to fail to add that almost without exception they delight in the use of tools; and it is no small punishment to be kept from the shop for some neglected lesson.

THE MANUAL TRAINING SCHOOL OF ST. LOUIS

differs from all other technical schools with which I am acquainted. It much resembles the Boston School of Mechanic Arts, though it differs from it in admitting boys at fourteen instead of fifteen years of age, in having a three years' course instead of two, and in having a full and independent equipment of study and recitation rooms as well as shops. I gladly avail myself of this occasion to publicly acknowledge my indebtedness to the able reports and papers published by Ex-President Runkle on the Russian system of tool instruction and the organization and work of his school.

All European schools of the same grade are more or less devoted to particular trades, excepting the school at Komatau, Bavaria, and, perhaps, other similar schools, where the shop work is three times as much per day as with us, and where book learning is crowded between very narrow limits.

In like manner all other technical schools in this country are either devoted to single trades, or they are of a higher grade.

PROSPECTUS OF THE SCHOOL.

A prospectus of our school has just been issued, giving in detail our course of study and the methods of tool-instruction. I shall be happy to give a copy to every one who is sufficiently interested to ask for it. To those who do not care for the details, I will say that our course of study runs through three years in five parallel lines.

First. — A course in pure mathematics.
Second. — A course in science and applied mathematics.
Third. — A course in language and literature.
Fourth. — A course in penmanship and drawing.
Fifth. — A course in tool work in woods and metals.

Our school is not managed on the assumption that every boy who goes through it will work as a mechanic, or that he will be a manufacturer. They will doubtless find their way into all the professions. We strive to help them find their true callings, and we prejudice them against none. I have no sort of doubt, however, that the grand result will be that many who otherwise would eke out a scanty subsistence as clerks, book-keepers, salesmen, poor lawyers, murderous doctors, whining preachers, abandoned penny-a-liners, or hardened school-keepers will be led, through the instrumentality of our school, to positions of honor and comfort as mechanics, engineers, or manufacturers.

NO ARTICLES MADE FOR SALE.

For the purpose of discountenancing certain grave popular fallacies in this country, I will add a word, even at the risk of repeating what I have said elsewhere, as to our plan of shop management. We do not manufacture articles for sale, nor do we pretend to fully teach particular trades.

A shop which manufactures for the market, and expects a revenue from the sale of its products, is necessarily confined to salable work, and a systematic and progressive series of exercises is practically impossible. If the shop is managed in the interest of the student, he is allowed to leave a step or a process the moment he has fairly learned it; if it is managed with a view to an income (and the school will be counted a failure if its income is wanting), the boys will be kept at what they can do best, and new lessons will be few and far between. In such a shop the pupils will suffer too much the evils of a modern apprenticeship.*

A very bright boy of seventeen years had expected last fall to enter a pattern shop in St. Louis as an apprentice, but was disappointed, there being no vacancy in the number of apprentices allowed. He therefore came to the Manual Training School, and during the year made excellent progress not only in carpentry or wood-turning, but in drawing, mathematics, and physics. When he showed me some of his handiwork at the end of the year, I asked him if he would have made equal progress as an apprentice. "No," said he, "I should have spent most of the first year sweeping out offices and running errands."†

SELF-SUPPORTING SCHOOLS.

I fancy there is no more pernicious fallacy than this of making a school self-supporting by manufacturing for the market. Suppose you attempt to maintain one of these popular humbugs, a commercial college, on that theory, or to run a free medical school without endowment, on the self-supporting plan (the students would probably write prescriptions cheap, and cut off legs for half price); or to manage a public school of oratory and English composition on the strength of an income derived from contributions to newspapers and magazines, and from orations made and delivered to order! Nothing could be more absurd, and yet the cases are closely parallel. No, do not be beguiled by the seductive promise of

* "The common apprentice is a drudge set to execute all kinds of miscellaneous jobs. There is not systematic gradation in the difficulty of the exercises given him; more than half his hours are purely wasted, and the other half are spent on work unsuited to his capacity. What wonder that four, five, or six years make of him a bad, unintelligent, unskilful machine." — *Prof. Sylvanus P. Thompson.*

† Since the above was written, a gentleman told me of his father's experience when learning the trade of a tanner in Philadelphia, many years ago. He lived in the family of his employer, and during the first six months he tended the baby.

an income from the shop. Admit from the first the well-established fact that a good school for thorough education on whatever subject costs money, both for its foundation and support.

Closely connected is the matter of teaching particular trades, to which the lads shall be strictly confined. Such a course may work well in monarchies, where the groove in which one is to run is cut out for him before he is born; but it is unsuited to the soil and atmosphere of America. A single trade is educationally very narrow, while their number is legion. "The arts are few, the trades are many," says Prof. Runkle. The arts underlie all trades; therefore let us teach them as impartially and thoroughly as possible, and then it is

BUT A STEP TO A TRADE.

And this brings me to a very important point. Admitting that with a suitable outfit of tools, shops, etc., a programme such as I have described can be carried out, you ask: "*Cui bono?* What, after all, is the manual training acquired at school good for? Has the mind been nourished through the fingers' ends? Has the hand gained any enduring skill? Is it really but a step from the door of the manual training school to the shop of the craftsman?"

Experience answers all these questions satistactorily, and adds that there is scarcely a calling in society that is not edified by manual training. Rousseau once remarked that "to know how to use one's fingers gave a superiority in every condition in life." I recently made systematic inquiry among the parents of my boys as to the effect of the one or two years' training in our school. Their reports on the points now under consideration are both interesting and encouraging. They write :—

"Gerald takes great interest in fixing up things generally."

"Charles fixed my sewing machine."

"George has made many little matters of household utility, and seems to delight in it."

"We go to Henry to have chairs mended, shelves put up, etc., and he does excellent work. He made a fine set of screen frames."

"The mechanical faculty was quite small in John's case, and it has been developed to a remarkable extent."

"Leo does all the jobs around the house." And so on, for nearly a hundred pupils.

Again, the parents testify to an increased interest in practical affairs, in shops and machinery, and in such books and periodicals as the *Scientific American*. Beyond question, there is a certain intellectual balance, a good mechanical judgment, a sort of level-headedness in practical matters consequent upon this sort of training, that in value far outweigh special products. Said Rousseau, in his "Emilius," one hundred and twenty years ago: "If, instead of keeping a boy poring over books I

employ him in a workshop, his hands will be busied to the improvement of his understanding; he will become a philosopher while he thinks himself only an artisan."

As to enduring skill, I will let you judge for yourselves. The blacksmithing has occupied the second-year class about two hundred hours, — ten a week. Each man had his forge and set of tools, and each executed substantially the same set of pieces. Here is a partial set of the work done. The pieces are numbered in the order in which they were done. They were first wrought in cold lead while the order of the steps and the details of form were studied, and then they were executed in hot iron. I have a few of the lead specimens here. The boys have not yet learned to weld the lead. The instructor's estimate of each piece is shown in the per cent stamped on it. The pair of tongs was made on time, — less than four hours. On the day of our public exhibition twenty boys worked at the forges about two hours. Practical smiths who were present highly commended their work. Their weakest point was their management of the fire.

Mr. Clark wished me to bring some of the wood-work. I could easily have brought a cart-load, but I thought it not necessary. The boys do not do fine work, of course, as these few specimens show. I, however, have tracings of the main exercises in wood-work.

As our school has seen but two years, I cannot appeal to its graduates to answer the question, How far is it from our door to positions as journeymen mechanics? hence I avail myself of the testimony of Mr. Thomas Foley, instructor of forging, vise work, and machine-tool work, in the Boston Mechanic-Art School. He had himself served an apprenticeship of seven years, and after several years at his trade had given instruction for five years. We must consider him a competent judge. In his report to Prof. Runkle, and contributed by the latter to the recent report of the secretary of the Massachusetts Board of Education, Mr. Foley says: "The system of apprenticeship of the present day, as a general rule, amounts to very little for the apprentice, considering the time he must devote to the learning of his trade. He is kept upon such work as will most profit his employer, who thus protects himself. . . . Now it appears like throwing away two or three years of one's life to attain a knowledge of any business that can be acquired in the short space of twelve or thirteen days by a proper course of instruction. The dexterity that comes from practice can be reached as quickly after the twelve days' instruction as after the two or more years spent as an apprentice under the adverse circumstances mentioned above." *

Mr. Foley secures the best results from lessons only three hours long. He adds: "The time is just sufficient to create a vigorous interest, without

* I take it that by twelve days he means one hundred and twenty hours distributed over about forty days.

tiring; it also leaves a more lasting impression than by taxing the physical powers for a longer period. We have tried four hours a day, but find that a larger amount of work and of better quality can be produced in the three-hour lessons."

I consider this testimony of Mr. Foley very conclusive. It effectually disposes of the claim, so often put forward by practical men, that no boy can learn a trade properly without going to the shop at seven o'clock in the morning and making his day of ten hours "man-fashion"; and that dirt and drudgery and hard knocks, and seasons of intense weariness and disgust, even, are essential to the education of a good mechanic.

THE COST.

It remains for me to touch upon the second important question you all have in your minds, namely, that of the cost. You are practical men and women, and you wish now to sit down and count the cost.

We set out in St. Louis to have the best of everything. We bought the best tools and put in the best furniture. We have plenty of room and light and pure air. We aim to have good teachers and all necessary appliances. Our capacity is about 240 boys, in three classes of 100, 80, and 60, in the first-year, second-year, and third-year class respectively.

Our building complete cost about	$33,000
Our tools and school furniture	16,000
If we add the cost of the lot (150 x 106½ feet)	14,400
We have as the total cost of our plant	$63,400

The building is of brick, three stories high, and very substantial. A perspective view of it, with the three floor-plans, is given in the little prospectus already referred to.

Where land is cheap, and less or lighter machinery is used, less money would suffice; but let no one deceive himself by supposing that the reform proposed is to be at once a money-saving one. Such a school costs * money, but it is a grand investment. Said one of our benefactors to me not ten days ago, "I feel better satisfied with the money I have put into the Manual Training School than with any other money I have invested in St. Louis."

As to the cost of instruction, the shop is about as expensive per hour as the recitation and drawing rooms. Good mechanics, fairly educated, who are at the same time endowed with the divine gift of teaching, are rare. We have a first-class machinist and an expert blacksmith, and pay

* The same objection, the cost, applies to chemical and physical laboratories; and one of the main reasons why so many so-called colleges in the Western States devote their attention almost exclusively to classics and mathematics and history is that they are too poor to properly cultivate chemistry and physics and practical mechanics.

each $1,200 per year. The size of our divisions is generally limited to twenty members; in drawing we shall occasionally "double up."

Incidentals — wood, iron, paper, etc., and the wear and tear of tools — amounted last year to about $10 per head. The total cost of supplies and instructions and all incidentals next year is estimated to be $75 per pupil.

How then, say you, can this costly reform be accomplished? The public schools have no funds to spare, salaries are still too low, and the demand for extensions outruns the supply. As Col. Jacobson of Chicago has said: "The alternative before you is more and better education at great expense, or a still greater amount of money wasted on soldiers and policemen, destruction of property, and stoppage of social machinery. The money which the training would cost will be spent in any event. It would have been money in the pocket of Pittsburg if she could have caught her rioters of July, 1877, at an early period of their career, and trained them at any expense just a little beyond the point at which men are likely to burn things promiscuously. It is wiser and better and cheaper to spend our money in training good citizens than in shooting bad ones."

HOW TO GO TO WORK.

There are two ways of going to work: —

First. Cut down somewhat, if necessary, the curriculum of higher studies, and incorporate a manual department with your high school. The investment will pay, and the means of further growth will soon be found.

Second. Mature your plans and lay them before your wealthy, public spirited men. Almost for the first time in America, we are harvesting a splendid crop of millionnaires. They abound in every city. They know that boundless wealth left to sons and heirs is often a curse, rarely a blessing, and they would fain put it to the noblest uses. In England such wealth would naturally go to the establishment of noble families, or the purchase of grand estates, which should be transmitted unimpaired to the oldest sons through successive generations.

Our American peerage shall consist of those who devote the gains of an honorable career to the establishment of institutions for the better education of generations that shall come after them. Let others follow the example of Cornell and Vanderbilt and Cooper of New York, Stevens of Hoboken, Girard of Philadelphia, Johns Hopkins of Baltimore, Case of Cleveland, Rose of Terre Haute, and those whom I could name in St. Louis.